MINING CONGRESS JOURNAL

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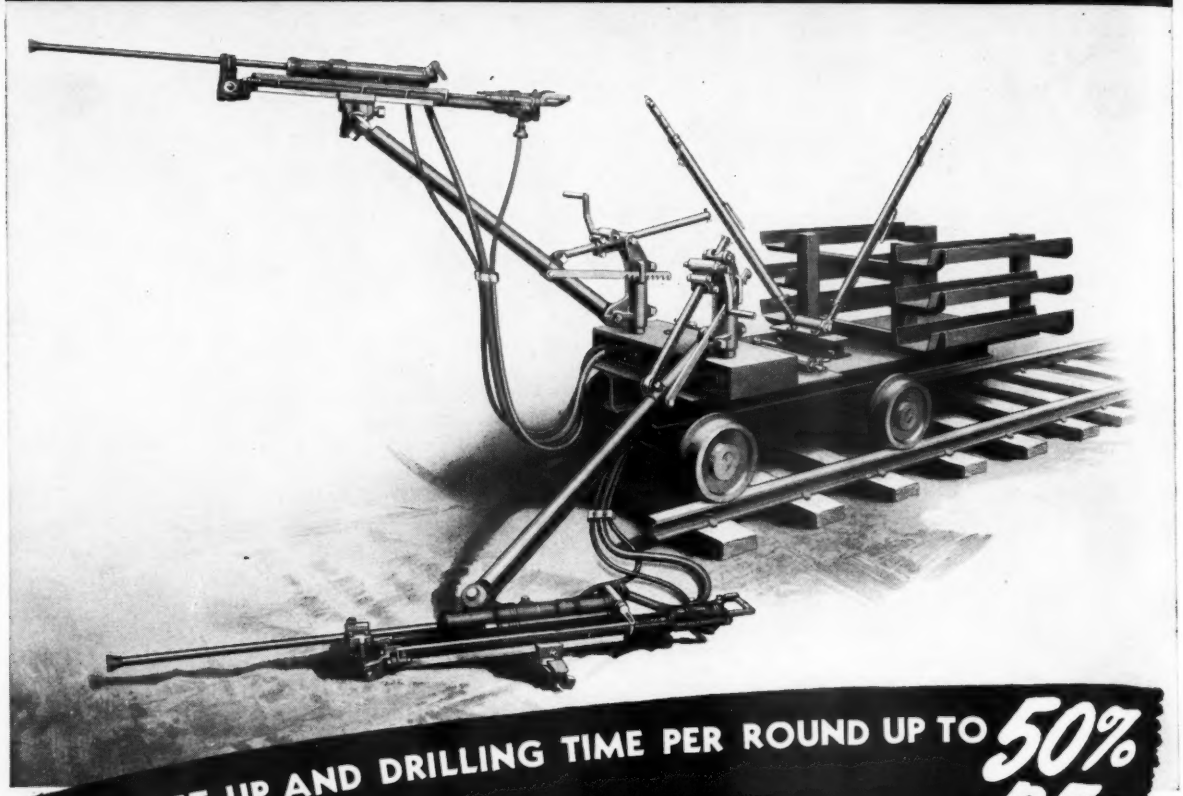

CUTS SET-UP AND DRILLING TIME PER ROUND UP TO 50%

WHILE INCREASING ROCK BREAKAGE UP TO 25%

These important advantages explain why you can't beat the Cleveland Jumbo for tunnel driving and drift mining:

- **GREATER SPEED** in setting up and tearing down as compared with using a column. Only two hoses to connect, air and water, instead of two for each machine. The MDR makes the holes easy to spot, and easy to drill to exact angles and positions.
- **LESS LABORIOUS WORK.** No columns, arms, clamps or shaft bars and drifters to be carried to face, no blocking or wedges to be driven in place, no heavy straining to push drifter to top of columns for roof holes. Both machines can be set ready to drill before one column can be set, ready for the arm.
- **GREATER SAFETY.** No blocks or wedges to loosen up, no crawling of the blocking while wedging against smooth roof. Drifters cannot fall, no smashed hands or broken fingers in placing drifters over arms and into saddles. Once the drifters are placed no connections to break.

Blocking is never required with the Jumbo; the ceiling jacks take care of usual variations in ceiling heights. Drill supporting arms swing laterally for drilling holes to hang the trolley or for starting crosscuts. These arms also swing to the rear to take up bottom or deepen drainage trenches.

You mount this outfit on your own mine car, arrange it to suit your particular drilling round, provide a water tank and steel rack, if desirable.

Bulletin 131 contains the full story on this outstanding rig. Ask for it.

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MINING CONGRESS JOURNAL

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WAR CONFERENCE

Of Metal Mining Industry

Western Division

American Mining Congress

Salt Lake City, Utah

November 16-17

(See page 25)

★

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A woman operating a General Electric magnetic switch to control an aerial tram at the London Mines & Milling Co., Alma, Colo.

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★

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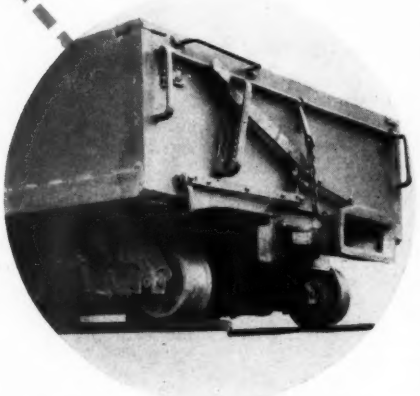
RUBBER DRAFT GEAR.....
unbreakable . . . conserves space . . . yet absorbs compression blows of 50,000 lbs.

POSITIVE INTERLOCK . . male-and-female design maintains engagement under vertical and lateral strain or pressure.

AUTOMATIC SELF-CENTERING . . makes it unnecessary to manually center coupler heads after uncoupling on curves.

Some *so-called* automatic couplers have one of these features. Some have another. Some have none! But only the O-B Automatic Coupler gives you *all three*—only the O-B Coupler is truly automatic!

Why jump halfway when it comes to automatic coupling? Get your money's worth. Get the best—specify O-B Couplers for your new cars. Send us a drawing of your proposed car and we'll be glad to show you, at no cost to you, how O-B Couplers can be incorporated in your car design. Write today or consult your O-B representative.



For greater safety, higher haulage speeds, car handling convenience and lower maintenance —specify an O-B Automatic Coupling System!

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OHIO B BRASS

MANSFIELD OHIO · U · S · A

Canadian Ohio Brass Company, Ltd. Niagara Falls, Ont., Canada

COMPLETE O-B PROTECTION FOR CONTINUOUS PRODUCTION

(All weighed-in on the platform scale, another Mack-load of coal gets the go-ahead and rolls away. Sketched from life, near Scranton, by Peter Helck.)

Well-known American, at work!

THE SAYING "Built like a Mack Truck" is something more than a slang phrase. It is an acute observation on the difference between a Mack . . . and just a truck! It worked into the language because of the way a Mack works into a job. The first Mack, built in 1900, served 17 years. No one knows . . . *yet* . . . what records today's Macks will make. But you can put it down as sure that the first Mack, today's Mack, tomorrow's Mack . . . all set out to be the *best* trucks in the world when made!

Mack Trucks, Inc., New York, N. Y. Factories at Allentown, Pa.; New Brunswick, N. J.; Plainfield, N. J.; Factory branches and dealers in all principal cities for service and parts.

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TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS
BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY . . . IF YOU PLAN TO GET ONE, YOU'RE WISE!

THE MECHANIZED MINE

IS THE ONLY MINE THAT KEEPS IN STEP WITH PROGRESS

Joy 32" Shuttle Car
Ease of control, and extreme flexibility in operation—together with its abundant power, have made this unit a time and money saver wherever it has been used. Its use has cut overhead and increased output in many mines.

Joy 14-BU Loader
This Joy Loader operates in seams as low as 36 inches—full automatic electric control, individual motors for gathering arms, caterpillars and pump. A rugged, heavy duty machine. Loads up to 5 tons per minute.

Joy 11-BU Loader
This heavy duty, mobile loader is designed for fast loading in seams averaging 60 inches or more in thickness. Embodies all the latest mechanical and electrical improvements. An economical unit.

"Yes, Sir—If you'll take a trip through that Joy Equipped Mine of ours, I'll wager you'll mechanize everyone of your mines. Those Joy Loaders and Shuttle Cars sure do a real job—"

Joy 42" Shuttle Car

While the Shuttle Car is relatively new—its continued success and constantly expanding use, proves it does lower section handling costs and definitely increases mine output.

Joy Conveyors

Joy designs and builds conveyors to meet the specific haulage and handling needs of mines throughout the nation. Joy Engineers offer the practical experience gained from many years of successful work within the industry.

Joy Engineers offer accumulative experience that should be of great value to every mining executive considering modern mine mechanization in relation to his particular and specific conditions.

This experience and advice is available to you.

JOY MANUFACTURING CO.,
FRANKLIN, PA.

BUY

Dumped 12,000 Times and Still Good as New

Here's The Car

• This is equal to 20 years of ordinary dumping of mine cars. Each car has dumped 12,000 times and discharged 132,000 tons of coal already in less than 4 years. Some have dumped 15,000 times, yet these cars are still debutants; not nearly grown up.

The man who uses them says this—"if you told anyone these cars had been dumped 12,000 times and then showed him the cars and doors, he might not want to believe you."

If anyone is still skeptical about the amazing service to be got from S-D "Automatics" at this day and age, we suggest that an alienist be summoned to examine his brain.

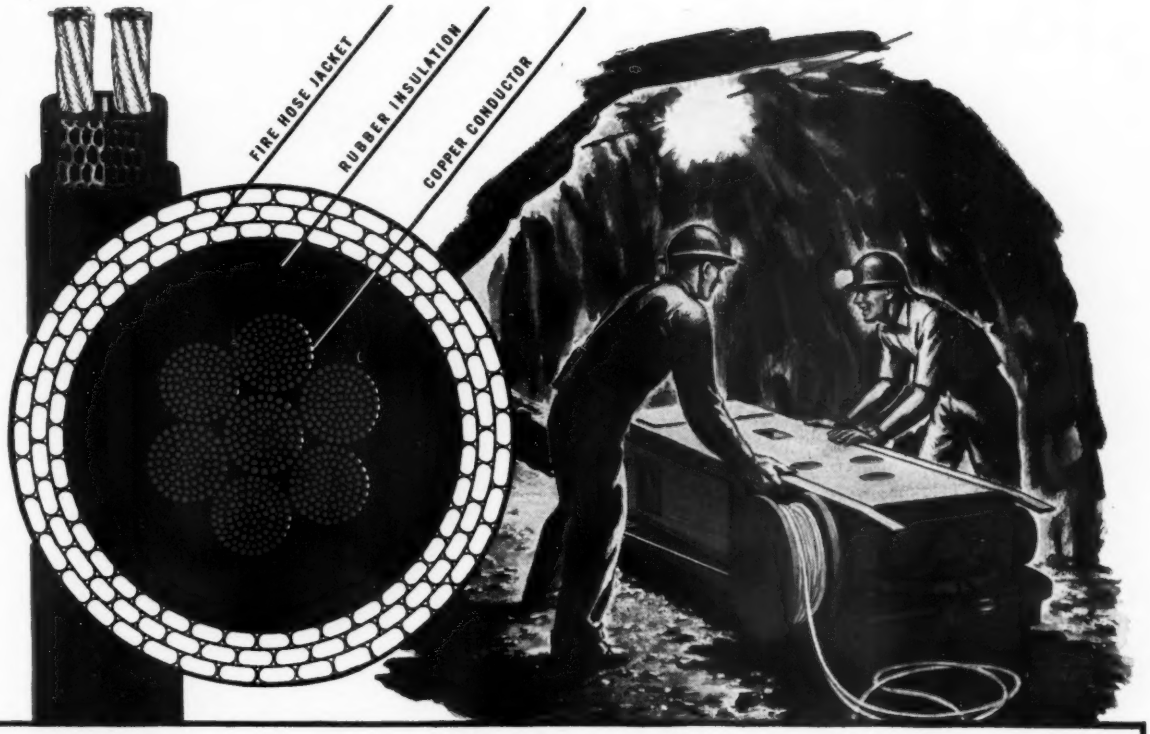
These cars are built strongly. They are exceedingly rugged. Yet, they are handled gently. They do not turn upside down. They are not tipped on end. They are not strained or racked. They are not even uncoupled. They merely are pulled across a hole. Why, then, for goodness sake shouldn't they last immeasurably longer than the old-fashioned style of cars?

We suggest that you anticipate your car requirements as far as possible. We are working at full capacity; doing our best to make reasonably prompt deliveries. Even so, please follow the suggestion of the War Production Board and anticipate your requirements. Order your S-D "Automatics" and S-D "Floater" Ball Bearing Trucks as far ahead as possible.

REMEMBER OUR RENTAL PLAN!

We gladly rent money-saving S-D "Automatics," with option to purchase. The average rental cost over a 15 year period is less than 2¢ per ton of coal hauled. The average savings for you will be many times this small rental fee. You cannot lose! Ask for details.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE



Duracord saves up to 50% rubber in portable cables...has a better than 20-year service record

THERE is nothing "ersatz" about Duracord*; it is a cable construction developed during the last war to meet the need for heavy-duty cords and cables . . . a need it is *currently* filling not only in mines but also industrial plants and shipyards.

The Duracord covering is woven like a fine hose—*not braided.* This tough yet flexible cover replaces the rubber jacket on all-rubber cords making possible rubber savings as high as 50%.

For further information, please send us your inquiries.

SUNEX SECURITYFLEX* TO WAR

This well-known all-rubber companion to Duracord has been preempted for the toughest kind of jobs in the war effort where all-rubber cord is mandatory. Until peace, its use will be strictly regulated. 47255

*Reg. U.S. Pat. Off.

Two marks of achievement – the cherished Navy "E" (awarded to two of our plants) for achievement in production...The Anaconda trade-mark for achievement in quality.

ANACONDA WIRE & CABLE COMPANY
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Sunex Securityflex and Duracord

ANACONDA WIRE & CABLE COMPANY

18 YEARS on the job!

A leading anthracite operator has just replaced several hundred Model A Wheat Cap Lamps (originally installed in 1923) with our latest Model GW.

18 years on the job is an enviable service record for a miners' cap lamp. We would like to send you one of these original Wheat outfits so you can see for yourself that they still represent a dependable source of light.

It will pay you to investigate the many improvements we have engineered into our latest models.

Latest Model GW

WHEAT
The Engineered Cap Lamp

Here are the 1942 features — judge for yourself!

1 Two bulbs (one for emergencies) — miner is never in the dark.

2 Center mounted, Krypton-filled bulb, gives 20% more light — no dark "shadow spot" in beam.

3 Choice of 3 reflectors gives narrow concentrated beam, a medium beam, or a widespread beam of light — suits all working conditions.

4 Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces — Total weight of Lamp complete 74 ounces.

5 Headpiece molded of strong bakelite; sealed, moisture-proof and dust-proof.

6 Rubber battery case — non-conductor of electricity — a valuable safety feature.

7 Battery solution (free) limited to one ounce total both cells.

8 Lead-acid type battery maintains high voltage throughout shift (80+% efficiency) — year after year.

9 Battery charged through headpiece and cord of cap lamp — a daily test of all connections.

10 Designed for self-service charging system for lowest lamp-house operating cost.

11 To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart — unit-sealed construction.

12 A payment plan (purchase or rental) to meet the requirements of companies — large and small.

Wheat Mine Lamps are the only Mine Lamps "powered" by Exide Ironclad Battery Plates made by The Electric Storage Battery Co., The World's Largest Manufacturers of Storage Batteries for every purpose.

SPECIALISTS IN MINE LIGHTING FOR 25 YEARS

KOEHLER MFG. CO.
Marlboro . . . Mass.

WESTERN U.S.A. E. D. BULLARD CO., SAN FRANCISCO, CAL.
CANADA H. C. BURTON & CO., HAMILTON, ONTARIO

BETTER LIGHT - LESS WEIGHT
NON-SPILLABLE

NEED MOTORS FOR WAR WORK?

4 things to do to get them quicker

YOUR AID ON THESE 4 POINTS WILL HELP US PRODUCE AND DELIVER MORE MOTORS

Tri-Clad motors are available in a full range of sizes from 1 to 100 hp. Your General Electric representative can supply complete information and help you get the Tri-Clad motor to do your job. *General Electric, Schenectady, N. Y.*

Your choice of G-E Tri-Clad motors will give you *extra protection* against (1) physical damage, (2) electrical breakdown, (3) operating wear.

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

SPECIFY TRI CLAD MOTORS

GENERAL ELECTRIC

1 Use standard, open, sleeve-bearing motors whenever possible

The standard Tri-Clad motor, though classed as an "open" motor, is so well protected that it gives good service on many jobs where special motors often were recommended.

Sleeve-bearing motors often can be supplied more readily than ball-bearing types because of the present demand for ball bearings on other war equipment. Use ball-bearing motors only where load or mounting conditions require them.

Special end shields and other modifications may result in delay for you and others.

Consider the use of standard or multispeed a-c motors in place of d-c motors wherever this alternative is possible.

2 order motors early . . . giving complete specifications

Place motor orders when you order the machines they are to drive.

If you are planning motor drives for conveyors or other equipment for new plants, place the orders as soon as design work indicates the motor requirements.

Avoid delay and mix-ups by giving complete specifications, preferably on an order form which your G-E motor representative can supply.

3 give complete priority information, properly endorsed

The filling of many motor orders is delayed because of incomplete priority information. If in doubt about details, call the nearest G-E office.

When placing orders for motors, be sure that complete priority data accompanies *each order* in the form of certificates, endorsements properly signed, etc. The priority is not effective in scheduling shipment until it is received by your supplier.

Your needs and the war effort are best served by using the proper priority rating assigned by the War Production Board for the job involved, and requesting delivery no earlier than actually required.

Under the Production Requirements Plan, builders of motor-equipped machines for subsequent sale may order their requirements in advance.

4 check with G.E. for delivery from local warehouse stocks

To meet urgent war needs, a supply of standard Tri-Clad motors is maintained at G-E factories and local G-E warehouses. Perhaps the motor you want, or can use with a few simple changes, is available for immediate shipment.

Your local G-E motor representative can furnish information on motors which may be in stock in the following cities:

Atlanta, Ga.
Boston, Mass.
Buffalo, N. Y.
Charleston, W. Va.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Dallas, Texas
Davenport, Iowa
Denver, Colo.
Detroit, Mich.
Houston, Texas
Kansas City, Mo.
Los Angeles, Calif.
Milwaukee, Wis.
Minneapolis, Minn.
New York, N. Y.
Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Calif.
Seattle, Wash.

VOL 110 NO 1 JULY 1

So That Free Men May Rule the Skies

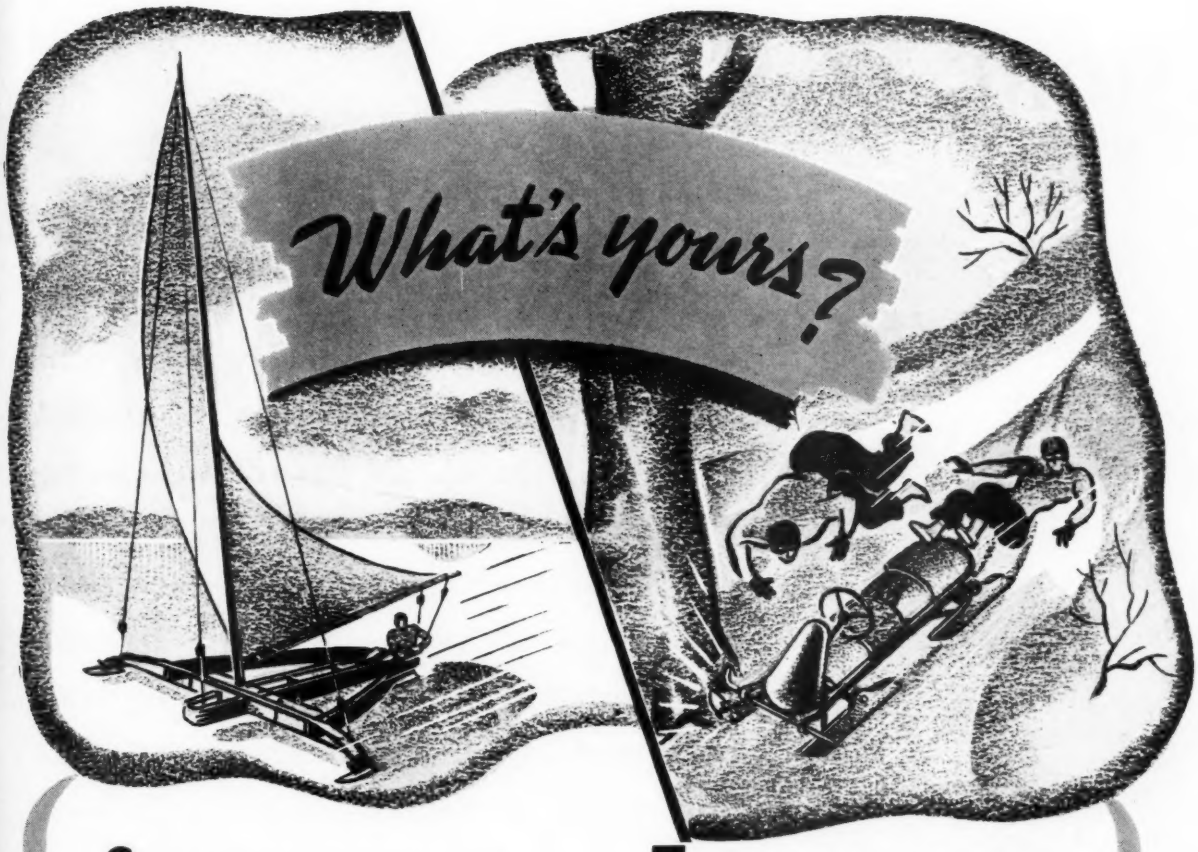
"Planes and more planes" is the battle cry of a free people. They know complete security rests with air supremacy—that air supremacy depends on their ability to out-produce the Axis.

Marion shovels are playing a vital part in keeping planes rolling off the Nation's assembly lines at top speed. Their job is in the mines, digging critical airplane building materials such as iron, copper, chrome, nickel, bauxite and manganese, and keeping them moving to the production front in an endless stream. This they are doing on a twenty-four hour schedule.

THE MARION STEAM SHOVEL COMPANY
MARION, OHIO, U. S. A.
Offices in all principal cities
Serving industry since 1884

MARION

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • PULL-SHOVELS • WALKERS
Gasoline — Diesel — Electric — ¾ cubic yard to 35 cubic yards



SMOOTH SAILING · or TOUGH SLEDDING

Now is the time, with selling shelved for the duration, to get ready for the days ahead when it will be "Sell or Sink."

This is plain: To have a chance in a competitive market, coal must be properly prepared—must be uniformly sized and thoroughly cleaned.

This, too, is plain: when our competitive market returns, the operator whose mine is up-to-date with efficient preparation equipment will find "smooth sailing"—compared to the "tough sledding" encountered by the mine that has not kept pace.

There's a simple, sensible first step toward putting your property in top-notch competitive condition— get in touch with us. You'll find a seasoned organization with the keen "know how" of experienced men who have had to solve every conceivable preparation problem. With no obligation to you, we shall study your individual problems and draft a recommendation. Better write us —to make sure of smooth sailing.

ROBERTS and SCHAEFER CO.

307 North Michigan Avenue, Chicago

P. O. Box 865 PITTSBURGH, PA. | 1711 Connecticut Avenue, N. W. WASHINGTON, D. C. | P. O. Box 570 HUNTINGTON, W. VA.

MORE COAL . . .

and keep it clean!

VITAL to war industry is not coal alone but good, clean coal and plenty of it. To insure this keep your present screening plant in good working condition—see that it is checked regularly. Breakdowns and dirty coal slow up war production. If a replacement becomes necessary consult a Holmes engineer.

EMERGENCY REPAIRS

Mines must run—repairs are needed from time to time—therefore, HOLMES has added an emergency repair department as an aid to mines in avoiding serious delays in production. The moment you need repair work, phone 1430 Danville, Illinois, and a HOLMES representative will be on the way at once.

HOLMES MINING EQUIPMENT

is sturdily built to produce good clean coal at the top production speeds of today efficiently and economically. Complete catalog listing all of the following equipment will be sent on request.

ENGINES—
- Hoisting
- Hauling

HOISTS—
- Electric
- Steam
- Skip

ROPE DRUMS—
- Cylindrical
- Conical
- Cylindro-Conical

SHEAVES—
- Wire Rope
- Plain Groove
- Steel Lined
- Bicycle

SCREENS—
- Bar
- Shaker
- Vibrator

GATES—
- Slide
- Coal Pocket
- Shaker

CHUTES—
- Spiral
- Lowering

CONVEYORS

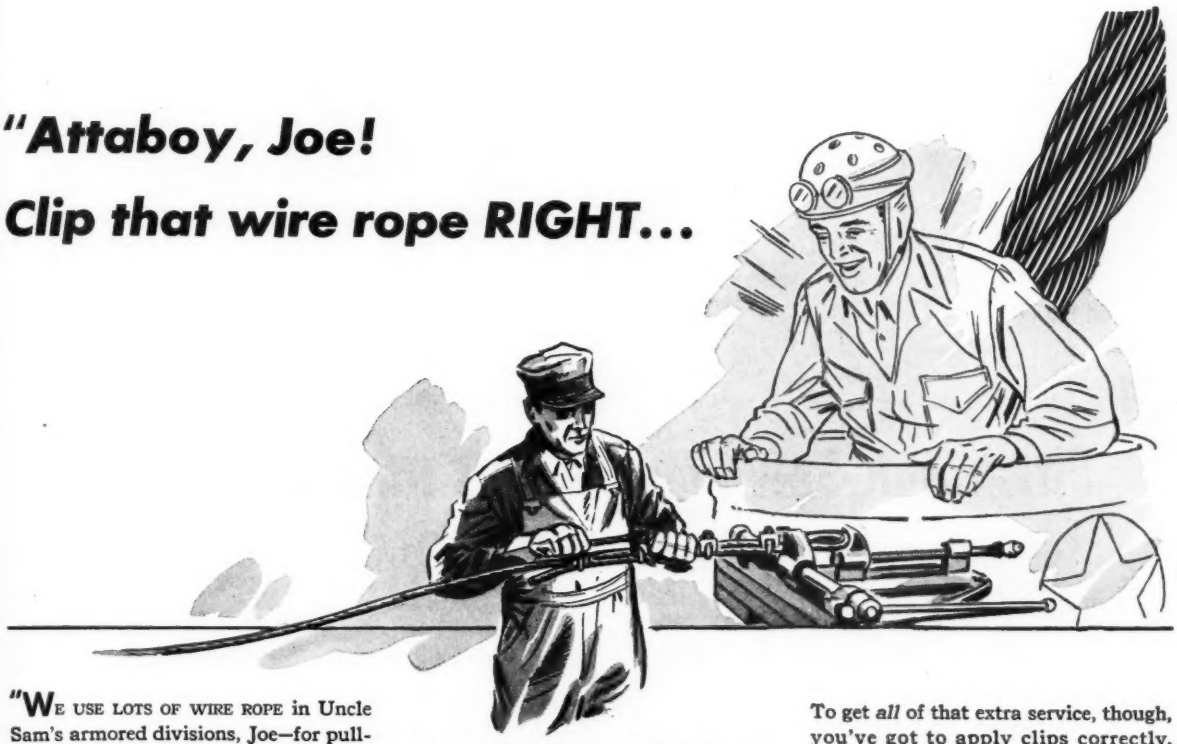
BUCKET ELEVATORS

ROBERT HOLMES AND BROS.

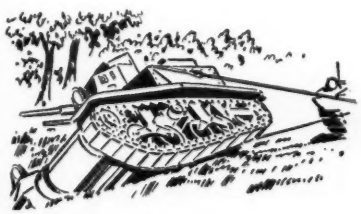
BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

DANVILLE, ILLINOIS

"Attaboy, Joe!
Clip that wire rope RIGHT...



"WE USE LOTS OF WIRE ROPE in Uncle Sam's armored divisions, Joe—for pulling out of tight spots, for towing disabled tanks and trucks, for handling heavy replacement parts . . . And we use it right and *fasten* it right, because we know men's lives in battle may depend on its being just as strong as it's supposed to be!"



Keeping wire rope "just as strong as it's supposed to be" is important *wherever* wire rope is used—on fighting front or production front! One factor in rope strength is correct fastening. *Properly used,* clips make a convenient and satisfactory fastening, developing 75 to 90 per cent of the rope strength.

When we build "Blue Center" Steel Wire Rope here at Roebling, we put in all the *extra* value of 100 years of wire-rope engineering. But even "Blue Center" Steel Wire Rope can't give extra service unless *enough* clips are used in fastening. The table below gives data for clipping "Blue Center" Wire Rope.

NUMBER OF CLIPS REQUIRED FOR "BLUE CENTER" STEEL WIRE ROPES

Rope Diameter	Number of Clips	Spacing of Clips	Length of Wrench
½" to ⅝"	4	3½" to 4¼"	12"
¾" to ⅞"	5	5" to 5¾"	18"
1" to 1⅛"	6	6½" to 7¼"	24"
1¼" to 1⅜"	7	8" to 8¾"	24"
1½"	8	9½"	24"

To get *all* of that extra service, though, you've got to apply clips correctly. Always use a standard wire-rope thimble. Put the clip U bolts on the dead end of the rope. Tighten bolts securely, but *do not crush rope!* Retighten all clips after an hour's full

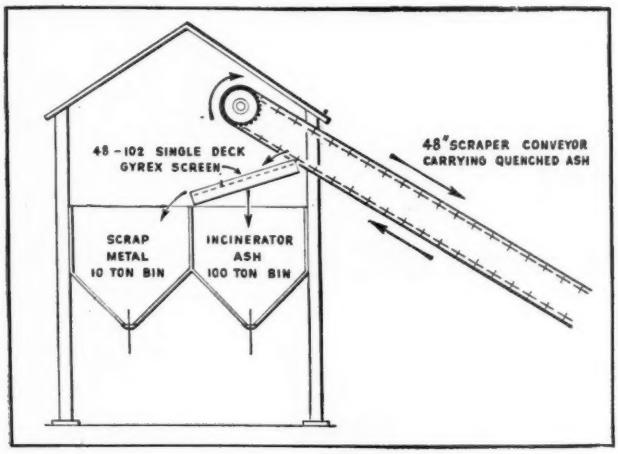
running time and also at all regular inspections. By following these rules for proper clipping, you'll be helping to keep rope on the job for Victory.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities

★ PROMPT SERVICE
★ on essential orders
★ from warehouse
★ stocks or mill

ROEBLING
"Blue Center"
STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED

Throw Your Scrap Into the FIGHT!



Pittsburgh Salvages 10,000 tons of Scrap —and nets $60,000

Robins engineers and machinery often participate in interesting installations. Many of them are unusual, some actually unique. One in the latter classification came up recently in Pittsburgh. Mr. D. C. Agar, Managing Engineer of the Bureau of City Refuse, wanted to salvage the scrap in city residue agglomerate. The screening methods used in coke plants seemed a logical and economical method of separation.

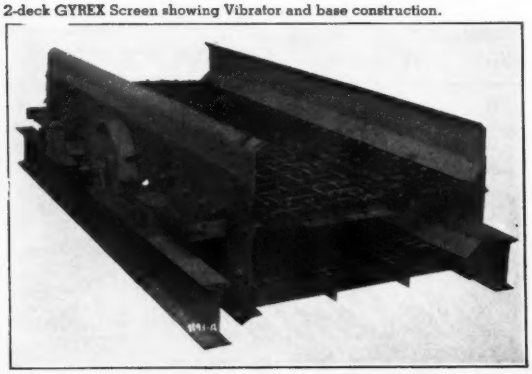
■ A suspended-type Robins GYREX Vibrating Screen was installed where it would receive material from the final scraper conveyor . . . at a total cost considerably less than $5,000.

■ At the present rate of recovery (and current contract selling-price) the City of Pittsburgh is recovering 10,000 tons of scrap for the war effort . . . and will net $60,000 a year from the salvaged metal.

■ Robins engineers are at your disposal for advice regarding economical efficient applications of screens and materials handling machinery.

ROBINS
CONVEYING BELT COMPANY
PASSAIC • N.J.

2-deck GYREX Screen showing Vibrator and base construction.



For Material Aid
in
Materials Handling
It's ROBINS

MINING CONGRESS JOURNAL

Published for the Entire Mining Industry by The American Mining Congress

H. C. CHELLSON, Editor

Volume 28 OCTOBER, 1942 Number 10

Who's Blocking the Labor Supply?

FROM all parts of the nation come cries of manpower shortages, some of the most frantic appeals coming from the southwestern states where so much of the nation's copper is produced. Our State Department and Department of Labor have arranged for the immigration of 2,000 workers from Mexico to help relieve the manpower shortage in western agriculture. Puzzling the mining industry, particularly in the light of the recent order closing gold mines, is the fact that the Mexican miners, long asked for, have not been permitted entrance to work in our copper mines under a similar arrangement.

Can it be that New Deal pussyfooting "power politics" supports the position of union leaders in that an influx of Mexican miners would weaken the union's bargaining power which capitalizes on maintaining a scarcity of labor in the copper mines?

A Senate investigation is in contemplation as to why such outrageous discrimination has lost thousands of tons of copper for the war effort.

The drastic gold mine shut-down order L-208, requiring the mines to stop breaking ore within seven days, will wreck the industry for the duration. Over the radio and in the press the public had been told that 10,000 men would be released for copper mining if gold mines were shut down. Government officials apparently held the same opinion, but after having been shown accurate surveys of the present manpower potential of the gold mining districts (from which most of the younger men had already departed), they announced that only 4,000 to 5,000 men were employed in the gold mines, of which only 800 to 1,000 are experienced miners and muckers. It had been stated that only a small portion of these would voluntarily seek employment in copper or other base metal mines, and deferment of any drastic move had been urged pending action on a general manpower allocation program and steps to bring miners from Mexico for the copper mines.

The U. S. Employment Service has been instructed to refer unemployed gold miners to jobs in the non-ferrous mining industry, but it remains to be seen how effective such procedure will be. It must also be remembered that gold mining communities are isolated, and their economic life is far more vulnerable than that of industrial centers. The gold miners' contribution to the war effort can hardly be what is desired when his family and community have been so suddenly and completely uprooted on short notice.

Since gold mines have been permitted priorities only on a very limited scale, they could not compete with, or deprive essential mines of supplies and equipment. The miner, his family and his community could contribute a much greater net gain to the war program under a less drastic order permitting the older family men to continue operation on at least a limited scale.

All this has focused attention on the anomalous action of government officials in sanctioning entrance of Mexican agricultural workers while at the same time failing to permit entry of available, experienced and vitally needed Mexican miners for the western copper mines. Possibly a Senate investigation may clear up the mystery.

Our New Format

READERS are presented with a new format of MINING CONGRESS JOURNAL beginning with this issue. Its purpose is to be "easy on the eyes" from the standpoint of presenting its "Tell How" articles in an attractive and interesting manner. New pictorial heads, descriptive of their respective departments have been added and a single typeface adopted both for the operating articles and other sections of the book, with a more generous allowance of space between lines and paragraphs.

Another feature will be found in "News and Views." There, MINING CONGRESS JOURNAL is supplying for the first time a long-felt want of its readers throughout the coal, metal, and non-metallic mining industries, with a general breakdown of major geographical areas—Eastern, Central and Western States—with localized news from the various mining states and districts. This arrangement provides a ready reference for the reader, both to the section of the country and, in considerable part, to the branches of the industry in which he is most interested.

In the Eastern states, of course, coal makes up the bulk of the mineral output, but important metal and non-metallic mines are also found.

In the Central states, iron ore, lead, zinc, fluorspar, sulphur, etc., as well as coal are the major minerals produced.

The Western states are traditionally known for their output of base and precious metals, but interest also is focused on new deposits, providing chromium, manganese, tungsten, quicksilver and magnesium. Coal mining is important too, but production is naturally far less than in the industrial East.

All these features of our new format contribute to make a more interesting MINING CONGRESS JOURNAL which is adding materially to its services for readers through the entire mining industry.

The walking motion of this walking dragline, the largest ever built, is controlled by the regulating generator

Progress In Shovel and Dragline Electrification

Like other pieces of industrial equipment, excavators have experienced transitional stages of improvement for more than a quarter of a century. Today they have greater capacity and efficiency and contribute much to the advancement of mechanized surface mining.

By PHELAN McSHANE
Manager, Mining Engineering Department
Westinghouse Electric & Manufacturing Co.

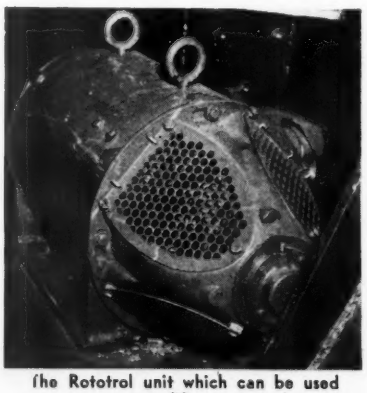
IT IS approximately 35 years since an electric motor was first applied to a power shovel, and the first attempts followed the usual pattern, that is, to apply a motor to a drive, originally designed for the steam engine.

The second stage, as usual, showed that a redesign of the mechanical arrangement was necessary to obtain the full advantage of electrification.

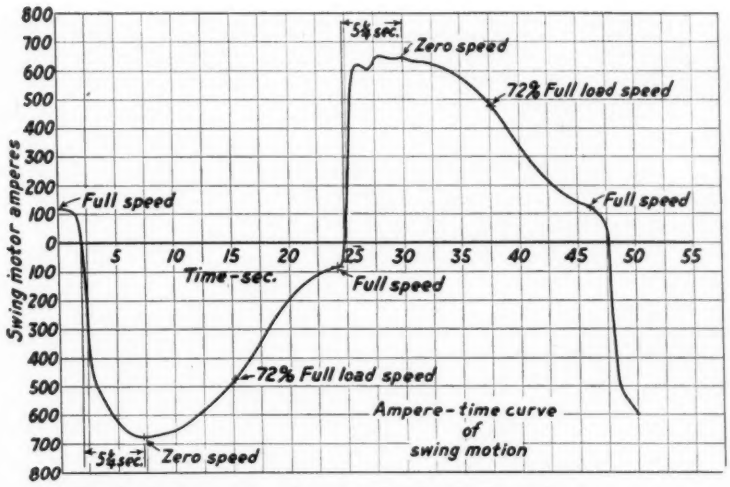
The third stage, and a long one too, might be called the stable or changeless period — the interval when results were so good that little thought was given to further improvements.

The introduction of the truck as a piece of mine equipment, which persisted in being under the dipper constantly, the demand for greater tonnage and less fatiguing operation, called for improvement. The urge for uninterrupted operation focussed attention on ease of maintenance, accessibility, and a reduction in time to effect repairs.

These factors caused a re-study of electrical designs, resulting in generators with improved electrical characteristics providing maximum accessibility and so built that they could be dismantled and reassembled quickly and without the time-consuming task of realignment. Each generator was built as a unit with its own bearings, and with the frames, brushholder, yoke, and bearing housing split—designs that obviate the necessity of removing the generator from the bedplate and breaking electrical connections to the machine. Flexible cou-



The Rototrol unit which can be used as a power amplifier, a speed regulator, a current control and an automatic acceleration-deceleration control



Graph of swing motion when controlled by the Rototrol

plings, mounted on tapered shaft extensions placed between each rotating part, facilitated their removal and solved another vexatious and time-consuming problem. Hand and foot-operated cam type master switches that are almost effortless to operate and free from maintenance problems that accompanies sliding contacts have also proved a boon to the operator of a busy shovel.

Operating cycles calling for rapid acceleration, and deceleration and real speed, with the accompanying mechanical stresses also have been given much consideration by the user, the shovel manufacturers and builders of electrical apparatus. For the larger shovels and draglines, the regulating generator, known as the Rototrol, that has proved so successful over a period of years in connection with skip hoists, large high-speed planers, and elevators, has been the answer to this problem. In addition to limiting the current peaks which helps commutation, this regulating generator greatly decreases mechanical stresses and simplifies the control as well.

One of the accompanying photographs shows this equipment as applied to a 33-yard shovel, which by the way is the first commercial installation of these rotating types of control ever to be applied to a shovel. It takes the place of contactors, interlocks, and large resistors. The control consists solely of the master switch, the Rototrol, and a small resistor to alter the value of the regulator fields and nothing more. No relays, interlocks, rectifiers, or other gadgets are used or required.

The walking motion for draglines is another new and successful application of the regulating generator. The dragline is lifted and sits down without jar or vibration.

Thus we have reached the fourth stage in excavator development, the stage when time, effort, cost and continuity of operation are being carefully studied and much progress has been made. Great credit for much of this progress is due to the excellent cooperation of the users of these tools.

Master switch enclosed, with cover removed

The rotating generator applied to this 33-cu. yd. shovel provides smooth operation and reduces stress on mechanical parts

Open pit bauxite mine in Alabama. Man in center is standing on sand and clay deposited by stream that cut through the middle of this deposit

Alumina From Domestic Sources

An appraisal of the general situation with reference to the production of alumina from other domestic raw materials as well as clay is made by the Advisory Committee on Metals and Minerals, of the National Academy of Sciences.

ABOUT two pounds of alumina (aluminum oxide) of high purity are required for the production of each pound of metallic aluminum. Projected production of metallic aluminum in the United States is now seven to ten times the peacetime rate a few years ago. This great expansion was started for purposes of defense and was augmented for the prosecution of the war.

In the past, all the alumina for the production of aluminum in the United States has been obtained from bauxite. Part of the bauxite was mined in the United States—chiefly in Arkansas—and part was imported from Dutch Guiana. All of it was chemically treated in the United States to separate the greater part of the aluminum oxide from the bauxite. The chemical treatment was effected by alkaline solutions by a method known as the Bayer process. The ingredients of the bauxite other than alumina, such as the compounds of iron, titanium and silicon, constitute the tailings from the Bayer process operation. This product contains sufficient iron to give it a red color and hence it is called "Red Mud." Lime and soda, used in the processing, are also present. Varying amounts of alumina remain in the red mud, depending upon the characteristics of the bauxite, the effectiveness of the treatment and, in particular, upon the amount of silica originally present in the bauxite. High-silica bauxites result in high alumina loss in the red mud.

Because of this relationship between the silica content of the bauxite and the alumina lost in the Bayer process treatment, there has been an incentive in the past to use low-silica bauxites. Much of the Dutch Guiana bauxite is low in silica and hence is a splendid Bayer process feed. In the domestic bauxites the silica content varies all the way up to 25 or 30 percent. The bauxites having a low silica content have been mined here for more than 40 years to provide

Alumina sulphate plant in one of the Southern states

alumina for the production of aluminum and for other purposes. While some of the higher silica bauxite has been mined for chemical purposes, most of it remains in the ground. Although there is no sharp dividing line between low-silica and high-silica bauxite, a few years ago an upper limit of about five percent silica was used to distinguish Bayer process bauxite from high-silica bauxite. In recent years, however, material containing more than seven percent silica has been used as Bayer process feed.

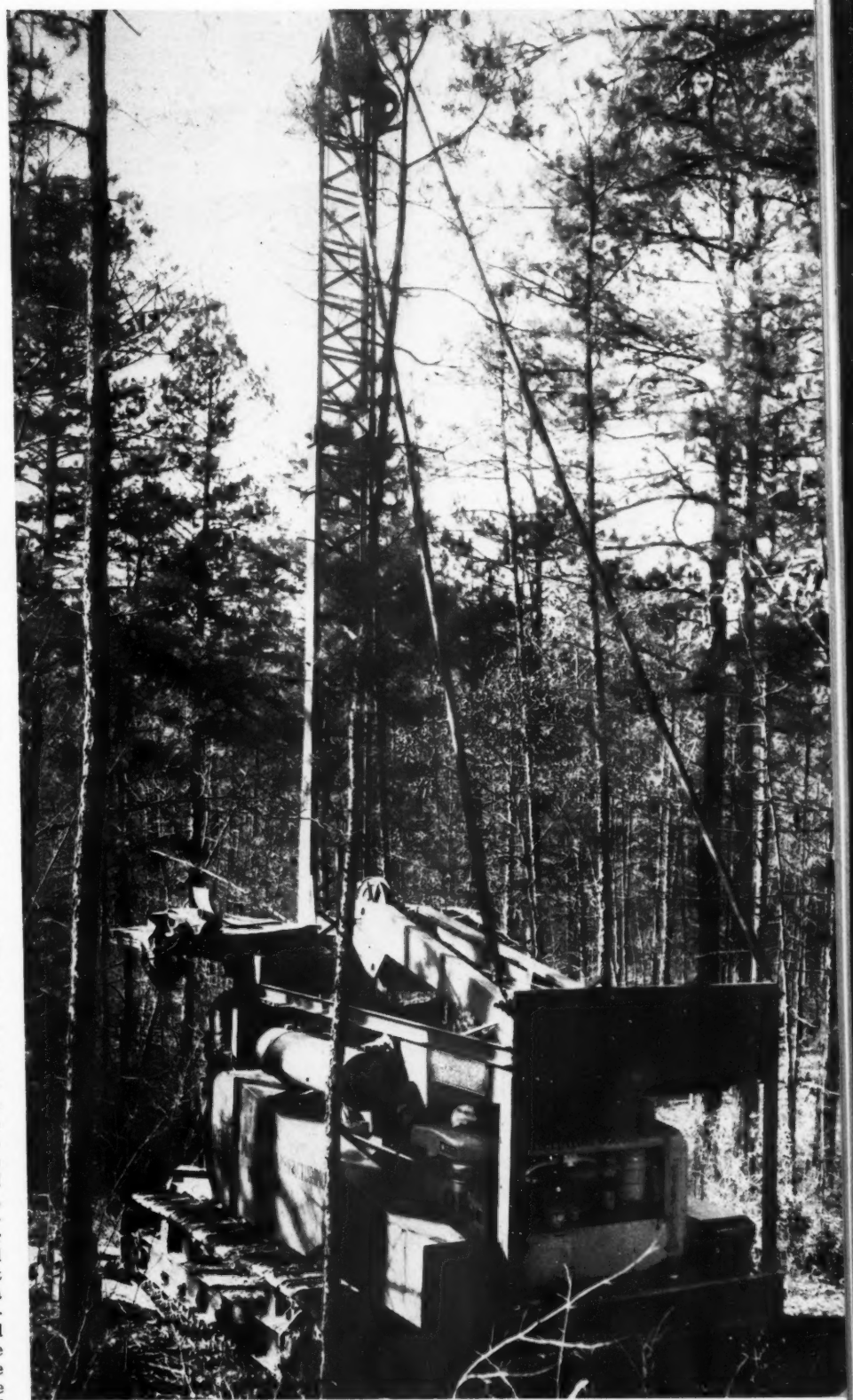
The alumina produced in the United States at present is made by the Bayer process, in plants operated by the Aluminum Company of America, and the Reynolds Metals Company.

High-Silica Bauxite Can Be Treated by a Washing Process

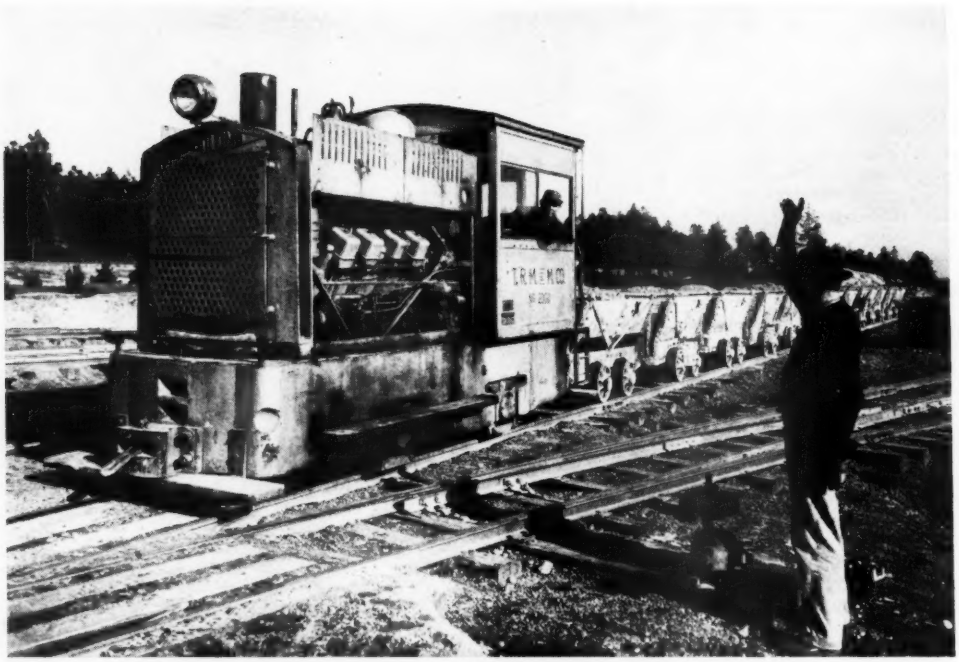
Next to low-silica bauxite, the best raw material for the production of alumina is high-silica bauxite. With reference to those bauxites the committee stated that certain high-silica bauxites can be treated by a washing process with a recovery of 60 to 80 percent of the original feed in the form of low-silica bauxite. The washed bauxite is then treated by the Bayer process, and high-silica bauxites can be treated by the Bayer-process at an additional cost for chemicals and freight and at an additional cost of processing as a result of lower yields. There is a possibility of producing low-silica bauxite from high-silica bauxite by flotation or other beneficiation methods.

A lime-soda sintering process has been developed for the treatment of high-silica bauxites. This process was outlined in a report and was recommended that it be put into operation.

While the original plan was to add limestone and soda to the high-silica bauxite and sinter the mixture, this procedure has now been changed. It is now planned first to put all the bauxite directly through the Bayer plant. A plant will be run entirely on high-silica bauxite, the average silica content being at present unknown but estimated to be in the neighborhood of 13 percent. By the Bayer process treatment of the high-silica bauxite, a large part of the contained alumina will be removed directly. The tailings, or red mud, will then be subjected to the lime-soda sintering operation. The Bayer red mud will contain soda, but will contain little, if any, added lime. It will contain practically all the silica of the original bauxite and a considerable amount of alumina. Lime will be added and sufficient soda will be added to bring the mixture to the proper composition for sintering. The sintered product will then be leached and the liquors will be added to the



Drilling test holes for bauxite in Arkansas



Bauxite ore in this open pit mine is hauled by a Whitcomb locomotive powered by a Caterpillar diesel

Bayer-process liquors. The red mud, or tailings, from this operation will contain very little alumina. The recovery of alumina from a ton of high-silica bauxite should be about comparable to the recovery from a ton of low-silica bauxite when treated by the Bayer process alone.

It should be pointed out that high-silica bauxite is, in effect, a mixture of bauxite and clay. Therefore, it may be said that substantial amounts of alumina will be produced from clay.

Alumina Produced from Clay

For the purposes of this discussion, the red mud from the Bayer operation in one plant may be considered as clay. If no red mud were available a certain amount of clay could be treated by the lime-soda process and the liquors could be added to the Bayer process liquors and thus, literally, alumina would be produced from clay. How much clay could be used in proportion to the original bauxite is not now known, but laboratory tests indicate that the amount should be substantial.

The estimated reserves of low-silica bauxites in the United States were stated to be in good volume and of high-silica bauxites quite substantial. To mine all the known bauxite would require vast overburden stripping and many underground mining developments. Furthermore, much of the low-silica bauxite is intermingled with high-silica bauxite.

There can be little doubt, however, about the advantage of operating a plant without the need of separating pockets of low-silica bauxite from the high-silica bauxite. For the most effective use of domestic raw materials for the production of alumina, therefore, it would seem desirable to consider having lime-soda sintering plants constructed at each of the Bayer-process plants. In addition to the current production of red mud, there are millions of tons of red mud which have accumulated during the past 30 or more years. The amount of alumina in this red mud is equivalent to that contained in about one million tons of bauxite.

If plants are equipped to operate on high-silica bauxite they are at the same time, equipped to utilize a substantial amount of clay for the production of alumina. The above program would appear to offer the best means of conserving domestic bauxite and at the same time offer the best means of utilizing existing alumina equipment in the manufacture of alumina from clay. It should be made clear that the changing of a Bayer plant to a combination Bayer-lime-soda plant involves much more than the mere addition of a set of kilns.

From the information now available, it would appear that the lime-soda sintering process can be used effectively on kaolin only in conjunction with a Bayer plant. There should be one or more processes ready for operation for the production of alumina from clay in which there is no dependence on a Bayer plant. The committee has given consideration to this matter, and it is their opinion that a modified Pedersen process offers the greatest promise for such a process. In skeleton form, this process consists of sintering the clay with lime and subsequently leaching with soda. There are many variations to be studied, not only in the sintering and leaching, but in the treatment of the liquors as well. Results of many laboratory experiments, here and abroad, give promise that the process will be operable, but it will be desirable to carry out additional work on a test plant basis to obtain data for the construction of a production unit.

Potash Alum Process for Morenci Tailings Project

It is the opinion of the committee that the Kalunite process or other processes dependent on the utilization of potassium alum are the best available acid processes for the production of alumina. The Morenci tailings project comes within the classification of a potash alum process. The Tennessee Valley Authority is operating an acid pilot plant for the production of alumina from kaolin.

The time is at hand when the do-

mestic bauxite should be conserved. The committee is informed that in the manufacture of most alumina abrasives a substantial amount of a special grade of low-silica bauxite is desirable, if not necessary. It may be desirable to earmark the required amount of the proper grade of low-silica domestic bauxite for the production of such abrasives as are essential. Apparently, large quantities of bauxite could be conserved and made available for the manufacture of alumina by restricting its use in the manufacture of aluminum sulphate. For use in small plants the clay could be calcined at some central source. The siliceous residues from clay would be more bulky than from bauxite, possibly necessitating the installation of additional settling equipment.

Because the alumina production program is so dependent on bauxite, the prospecting program for the discovery of new domestic deposits should be prosecuted. Known deposits should be appraised as to grade, size and minability. It is probable that a few millions of dollars spent for these purposes would save a few tens of millions in the long run.

The production of alumina, lime-soda sintering plants in connection with the Bayer-process plants, would enable each Bayer-process plant in the United States to operate on high-silica bauxite and it would also make possible the production of a portion of the alumina, in these combination plants, from clay.

Alumina from Clay by the Pederson Process

A modified Pedersen process for the production of alumina from clay is a most promising process that will be independent of the Bayer process. This process consists essentially of sintering clay with lime and subsequently leaching with soda. There are many ramifications in the details and in the treatment of the liquors which require test plant study.

The necessary amount of domestic low-silica bauxite, with other favorable characteristics for the production of certain abrasives can be earmarked for future abrasives production.

Quantities of bauxite could be conserved by restricting its use in the manufacture of aluminum sulphate. Calcined kaolin clay apparently can be substituted for the production of aluminum sulphate.

Because the best raw material for the production of aluminum is bauxite, the prospecting program for the discovery of new domestic deposits should be prosecuted vigorously and that the known domestic deposits be appraised as to grade, tonnage and minability.

Engineers and geologists of the Bureau of Mines and the Geological Survey report that a substantial tonnage of bauxite has been blocked out by drilling in two Georgia counties. They are in the Andersonville district of Sumter and Macon Counties.

It is expected that mining operations will be started soon. The investigations indicated that nearly 50 percent of the bauxite in the deposits contains 58 percent alumina and is rated as grade "B" ore. Processing plants can handle this grade of ore without much preliminary treatment. The remaining tonnage is grade "C" Georgia bauxite and may be utilized through methods developed both by the Bureau of Mines and private industry.

A clay quarry in Georgia showing bauxite lens

Unloading platform is of substantial construction

Trucks In Open Pit Mining Observe "Safety First"*

When large capacity trucks were introduced on the Mesabi range some new hazards in ore haulage had to be eliminated. Close cooperation between the operating and mine safety departments of companies in the Lake Superior district has brought protective measures assuring efficiency and safety in all phases of this modern type of ore transport.

By S. E. SULLIVAN
Oliver Iron Mining Co.
Chisholm, Minn.

THE USE of trucks in mining Mesabi Range ore bodies is a relatively recent development. Starting a few years ago with standard 2-cu. yd. trucks hauling four or five tons over rough roads having dangerous grades and curves, this method of transportation has been developed to the stage where we now have specially designed trucks, of ten to thirty-ton capacity, operating over carefully designed, well built, and well maintained roads.

As a general rule, the safety factor in truck operations varies inversely with the grade; the steeper the grade, the greater the operating dangers. Even though modern trucks are equipped with vacuum or hydraulic brake-boosters and have adequate braking capacity, the sudden application of brakes when descending into the pit over a wet road may be accompanied by disastrous results. When shifting gears while climbing out of the pit with a load, the operator may lose control if he does not shift rapidly enough and the truck slips backward. Both of these dangers can be reduced to a minimum and nearly eliminated by limiting the grade to 8 percent, keeping the road in good operating condition, and, during freezing weather, applying sand or calcium chloride when necessary.

It is an accepted fact that the success of truck operations is dependent to a great extent upon the conditions of the haul roads. Money spent in the construction of good roads is a wise investment. Roads that carry two-way traffic are usually built from forty to fifty feet wide, of concrete, stabilized material, rock or gravel. Although the concrete road is undoubtedly the most permanent, roads constructed of sized rock with a binder of sand, clay, and oil have proved to be satisfactory in both wet and dry weather. This type road is built about three feet thick and is maintained constantly with a power grader, sprinkler and roller. Another satisfactory road can be constructed with heavy rock as a base filled in with smaller rock and top dressed with fine rock. The advantage of this type road is that it can usually be constructed from materials at hand.

Roads should be crowned but not to the extent that they develop a hazard from side slipping. Ditches should be maintained in good condition to carry water away from the road. A power grader should be used constantly to insure a smooth surface, and in dry weather a sprinkler is necessary to allay dust, which not only causes discomfort to drivers and shortens the life of the motors, but also creates a hazard by decreasing visibility, especially at night. Constant sprinkling and blading will make the roads almost as hard as pavement in a short time. Curves should be open and sweeping and should be raised on the outside to facilitate driving. The embankment side of the road should be protected in some way, such as with a post and cable fence or a windrow of dirt or ore with white targets

* Presented at the Mine Safety Conference of the Lake Superior Mining Section, National Safety Council.

mounted on metal posts about five feet long and spaced 100 to 200 feet apart to mark the danger areas. At night the white targets loom out very effectively and the windrow of dirt will impede the progress of a truck without damaging it. Similar targets are also used in the pit to mark cuts on lower benches, thus warning drivers coming on shift of cuts that might have been taken out on the preceding shift. These markers are also used on stripping dumps and approaches to ramps.

In selecting trucks it should be remembered that truck driving in mines is a strenuous occupation, and due consideration should be given to the comfort as well as the safety of the drivers. The cab should be large enough so that the driver will not have to work in a cramped and tiring position. For winter work it should be equipped with a good heater, frost shields, and sleet remover. The canopy which protects the cab should be strong enough to withstand the impact from chunks of ore or rock which might fall on it during the loading operation. It should extend out in front far enough to protect the windshield from falling material, but it should not extend so far that it obscures the driver's vision. It has been found that certain types of canopies form a fair sun shield for a large portion of the day.

When a truck is being loaded in the pit, it should always be spotted on the side away from the bank, and whenever possible, on the shovel operator's side. In so doing the operator is better able to watch his truck and to see that it is properly loaded. Shovels should never swing over the cab.

Trucks should not operate closer than 100 ft. apart

A dumpman should be stationed at each dumping point to assist the driver in backing properly. For safe operation the truck should be equipped with a backing light.

When hauling, either loaded or empty, trucks should not operate closer than 100 feet apart.

When parked on a grade, the truck should be left in gear with the motor stopped and the brakes set and carefully blocked with the wheels cut toward the bank.

It is essential to the safety of truck operation that all equipment which moves on the roads including graders and tractors as well as trucks be given a regular and thorough inspection at least once every twenty-four hours. Some mines inspect all moving equipment at least twice each day, with the major inspection taking place when the unit is brought in for greasing. During this inspection, which requires from thirty to forty-five minutes, the brakes and lights are tested, the steering apparatus and spindle bolts are checked, and a general inspection is made for loose bolts and nuts. The second inspection, made on one of the shifts when no greasing is done, is a relatively hasty one and requires only

Ample width of roads provides two-way traffic

about fifteen minutes. By following this procedure, the factors which contribute to road accidents are often discovered and corrected in the shop.

Boxes should always be blocked when they are in a raised position. Some companies use a four inch pipe or timber about six feet long for this purpose, while others equip their trucks with a blocking device which is permanently attached to the box.

On the Mesabi Range winter operations in open pit mines consist principally of stripping. Trucks frequently mire down, either in clay that is being stripped or in soft material on the dump, necessitating the use of tow cables. For this purpose 20-ft. lengths of discarded shovel hoist cable, 1 or 1⅛ in. diameter, are often used. The 1 in. cable is comparatively light and flexible and is strong enough for the average job. It should be provided with a round hook at each end. One or two extra-heavy cables should be available for exceptionally heavy towing. Most heavy duty trucks are equipped with tow hooks built into the chassis. With this type of truck a cable with a clamped loop at each end is satisfactory. Care should be taken to use only the sound portions of discarded cable.

In freezing weather, the removal of dirt from truck boxes presents a definite problem. Even when diesel fuel or salt brine is sprayed in the box to prevent freezing, much effort is required to keep the boxes clean. Boxes are usually cleaned on the dump. After dumping the load the driver takes his truck out of the line of traffic and he and the dumpman proceed to scrape out the box with long-handled chisels provided for this purpose. Frequently the material breaks loose in large chunks, and to guard against foot injuries, safety toed shoes should be used as much as weather conditions will permit.

When new drivers begin work, a training period under the supervision and direction of an experienced driver is essential. This period should continue for a minimum accrual of twenty-four hours, and longer if necessary.

Since the efficiency of the night crews is dependent to a large extent on the amount of light provided for them, it is desirable to have as much light as possible in the pit and on the ramps and dumps during the dark hours. Light should be placed as close as possible to the active portion of the pit, but due to the fact that power lines in the pit may interfere with an efficient operation it is often necessary to place the lights on the crest of the pit.

Ramp Crew Must Be on the Alert

When electric shovels or drills are used in a pit, it is necessary in some manner to convey the power cables across truck roads. Several types of carriers are in use. One type is in the form of a pyramid and is constructed of welded 2-in. pipe. The base is about 4 ft. square and the posts about 10 ft. long. The two front posts are almost vertical, while the rear ones are inclined at an angle of about 60 degrees. Rungs are placed between the two rear posts, forming a ladder. A double sheave at the top carries two cables. This type of carrier is sufficiently strong, but light enough so that it can be easily towed into position with either a truck or tractor.

A wide and well maintained road helps the driver in climbing steep grades

Loading ramps are usually trestle extensions of ramp fills, about 20 ft. high. Into them are built rail or bar grizzlies, about 5 x 18 ft. with the bars spaced from 3 to 8 in., depending on the maximum size of product to be shipped. Since heavy trucks back out on these ramps many times each day it is essential that they be soundly constructed. A ramp crew consists of at least one man on top and two men below, for spotting the cars through the ramp. The top men must be extremely careful to be out of the way of falling material that might drop from the truck while it is dumping. All members of the ramp crew must always be alert to the danger from a truck that might back into them while they are occupied with other work. To eliminate this danger one man of the crew should be responsible for signalling the trucks while backing and for the safety of his fellow workers. An air hammer without rotation can be used for breaking the larger ore chunks which separate out on the grizzly, and sledge hammers for the smaller ones. All members of the ramp crew should wear safety goggles at all times. The man using the air hammer should stand on a hardwood platform about 4 x 8 ft. made of solid ½-in. hardwood, but light enough to put down and pick up quite easily. The ramp must be protected with a heavy railing, and have sufficient lighting.

The man in the bottom crew brings the cars from the tail track, spots them for loading and drops them into the yard. The spotting operation through the ramp may be done with air, controlled by a member of the ground crew. It is a good practice to have an electrically operated car mover for pulling the cars through the ramp. This does away with most of the pinching of cars which is necessary when a car mover is not used.

Safety Belts Should Be Provided

Car riders should be provided with safety belts to be used at all times while they are riding cars, and they should also use slip proof brake wheel bars. Since they are moving about under the ramp they should also use skull guards. It is important to have extremely good lighting around the ramp, with yard lights extending the complete length of the yard and tail track.

Although truck mining has benefited from the progress previously made in mine safety, its introduction and development have created hazards heretofore unknown to the mining industry, and only through the close cooperation of the operating and safety departments has it been possible to discover and guard against these new hazards and in a few short years bring this new mining method to its present high state of safety and efficiency.

Metal Mine War Conference

Part of the great Utah copper pit

Top ranking officials of the war agencies will discuss problems of manpower, production, prices, etc., at the 1942 Western meeting in Salt Lake City, November 16-17.

PLANS for the 1942 meeting of the American Mining Congress, Western Division, which had been held in abeyance due to the war situation, have now been crystallized. High executives of the war agencies concerned with the production of metals and minerals have expressed the definite view that such a meeting this fall is eminently desirable and should be held, and have agreed to participate in round table discussions with industry leaders at that time. The 9th Annual Metal Mining Meeting accordingly has been scheduled for Salt Lake City, Utah, on Monday and Tuesday, November 16 and 17, with headquarters at the Hotel Utah. The meeting will be distinctly a War Conference, with business sessions in the morning, afternoon and evening of each day.

Latter Day Saints Temple, Salt Lake City

Keynote of the meeting will be greater production of the war-essential metals. Recognizing that the manpower problems of the mines are of critical concern to the nation, both Major General Lewis B. Hershey, Director of the Selective Service System, and Brigadier General Frank J. McSherry, Director of Operations for the War Manpower Commission, will address the meeting and enter into a full discussion of these problems. Other measures needed to increase production; metal prices, quotas and premium payments; priorities on machinery and equipment, repair parts and supplies; government financing, and the varied questions of strategic mineral production will be discussed by officials of the War Production Board, Office of Price Administration, Metals Reserve Company, and other agencies responsible for these matters. Full opportunity will be given for questions and discussion by members of the industry, out of which will come a better understanding of the work which lies ahead.

Also planned are a special meeting of mining manufacturers to consider the urgent problems of materials supply, and group meetings of those concerned with the production of particular metals or mineral products.

In keeping with the times, entertainment will be at a minimum and the usual exposition of machinery and equipment will be omitted.

Since transportation lines and hotels are already handling a greatly increased volume of business, railroad and hotel reservations should be made at once.

Shuttle Cars Achieve High Output Per Shift At No. 25 Mine

Three years' experience has proven the effectiveness and economy of shuttle cars at this Northern West Virginia property of Consolidation Coal Company.

By G. B. SOUTHWARD
Mechanization Engineer
The American Mining Congress

THE SEAM worked at the No. 25 Mine is the Pittsburgh which has the usual mining height of 7 ft.; top coal is left for roof which can be supported on cross bars so as to give adequate width for mechanical loading between the posts; the mine floor is of hard slate which lies fairly level, with only minor grade variations due to local dips. Conditions generally are favorable for shuttle car operations.

The officials of the Consolidation Company, however, realize that good conditions in themselves do not automatically guarantee economical mining. Careful planning and intelligent supervision are primary essentials and these must be backed up by adequate power, constant maintenance and prompt delivery of supplies. The adherence to a system, once it has been proven correct, is an extremely important point. Laxity can easily become cumulative and the failure to perform during each shift, the work that is scheduled to be done in that shift, only adds to the burden of the following days, and "buck-passing" becomes an established custom. In presenting this account, the company officials wish to stress that in a mechanical operation, teamwork is the real key to success and that a "team" does not mean simply a loading unit but the entire mine force—supervisory staff, electricians, tipple men and on down through the machine crews to the common laborer. Hand loading experience is not sufficient and all must be trained to cooperate in the work which they have to do.

The following article will give a brief general outline of the mining system and the principal features of the operation; these follow accepted practices with certain modifications that have been worked out to suit the conditions encountered. However, it is worth mentioning that, with the exception of some changes in minor details, the present methods are those which were put into effect when the shuttle cars were installed over three years ago. The three-year test has therefore proven that these methods are correct, and a further proof is evidenced in the constantly rising rate of production that has occurred during this period.

Figures in Table I give the record, from March, 1939 to date, for an operating unit, consisting of one loading machine with three shuttle cars, and show how the shift production has increased since 1939, with monthly figures for the first eight months of 1942 to show the high level of the productive performance that is now obtained. It will be noted that all figures are yearly or monthly averages; peak productions on individual shifts and days have of course greatly exceeded the averages, but these peak figures are purposely not given, as such records tend to be misleading rather than constructive.

The operating unit consists of one tractor-mounted Joy 11 B.U. loading machine; one tractor-mounted 29 L.E. Jeffrey cutting and shearing machine with a 9-ft. cutter bar; three Joy shuttle cars of 6-ton capacity, operated by storage batteries, rubber-tired, with a bottom conveyor for unloading; and one portable electric drill using detachable drill bits and mounted on a rubber-tired home-made truck. The drilling supplies are transported on this truck, which was constructed from an automobile chassis, and is propelled by a motor with a trailing cable. The shuttles, at their unloading station, discharge onto a Joy elevating conveyor which loads into mine cars of 3-ton capacity; this elevator is a self-contained unit, mounted on wheels, and is easily moved on the hard mine floor.

The operation, in general, follows the usual mechanical loading practice in the sequence of performing the different classes of work. The average crew consists of 20 men; two on each of the machines for cutting, loading and drilling; three shuttle car operators; six men setting timbers and two recovering timbers; one shot firer; one elevating conveyor operator; and a general clean-up man for scrapping and sprinkling. These crews are employed on each seven-hour shift, and two shifts are worked per day—from 7 a. m. to 2:30 p. m. and from 6 p. m. to 1:30 a. m. All places are top cut and center sheared but the rate of the cutting machine is somewhat slower than that of the

TABLE 1—TONNAGE PRODUCTION FOR A SHUTTLE OPERATING UNIT

Year	Tonnage	Number Shifts	Average Tons Per Shift
1939 (9 months)	130,921	324	404.08
1940	226,498	503	450.29
1941	215,675	461	467.84
1942 (8 months)	166,678	312	534.22

Performance for first eight months of 1942:

Month	Tonnage	Number Shifts	Average Tons Per Shift
January	18,063	29	622.86
February	15,254	26	586.69
March	23,397	41	570.66
April	22,800	44	518.18
May	19,495	42	464.17
June	22,896	44	520.36
July	22,531	44	512.07
August	22,242	42	529.57
Total	166,678	312	534.22 Average

loader so that it is necessary to have three cutting shifts for a two-shift loading operation.

The mining plan is the block system in which entries and cross-cuts 14 ft. wide are driven on 90-ft. centers, leaving blocks of coal 76 ft. square which are recovered on the retreat. The normal panel width is 630 ft; the length is governed by underground conditions such as location of the outcrop, etc. The development is made by a series of five entries, which are driven on the inby side of the panel with a 270-ft. barrier next to the previously mined area. On the retreat, the barrier is opened with standard 90-ft. square blocks and the pillar line is carried across the entire panel width. The general plan is shown in Fig. 1, in which No. 9 right panel is retreating and No. 10 right indicates the development.

The blocks are recovered by cross-cuts which are driven 18 ft. wide through the end of the pillar. A small fender of coal is left next to the gob line but the system, in effect, is open-end pillar recovery. Only small stumps are left unmined and a high percentage of coal extraction is made. The pillar falls occur with reasonable regularity after a block is completed and it is seldom that the roof will hang or any excessive weight develop.

The preliminary development off the main heading is made by a Joy tractor machine loading into mine cars which drives the five panel entries through the main barrier pillar and up to a point where the first shuttle loading station can be installed. This is illustrated in Fig. 1 where No. 10 right has the preliminary development under way and the panel is being made ready for the shuttle operation to carry on. The method of driving the preliminary development with mine cars, is made possible by the fact that at this mine there is a second loading machine available. This is employed periodically as above described, but normally is operated to complete some panels in the older sections of the mine that were formerly worked with hand loading and where the remaining area is not sufficiently large to justify a shuttle installation.

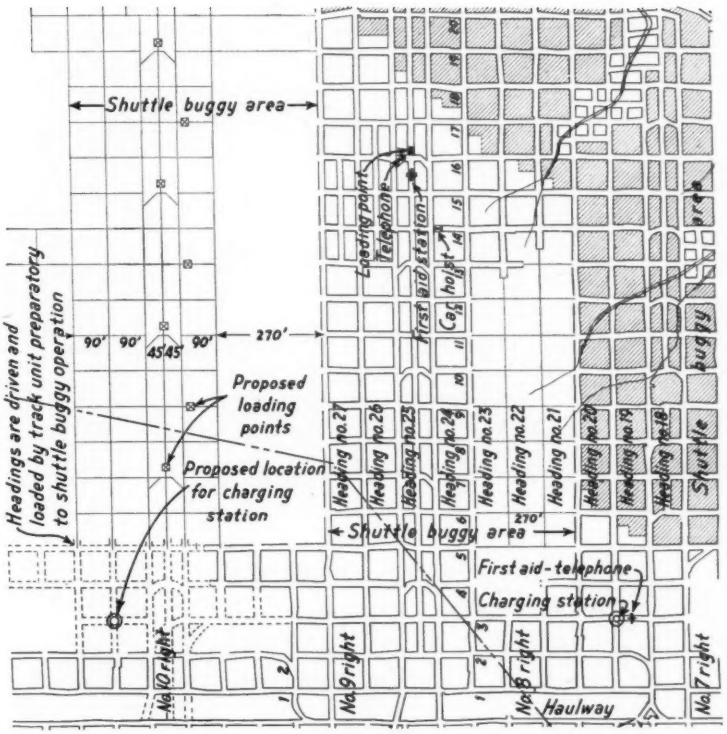
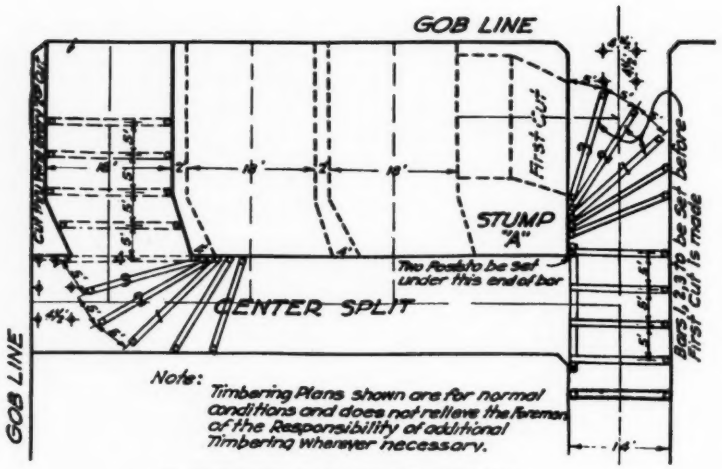


Fig. 1. General mining plan for shuttle car operation at the No. 25 mine

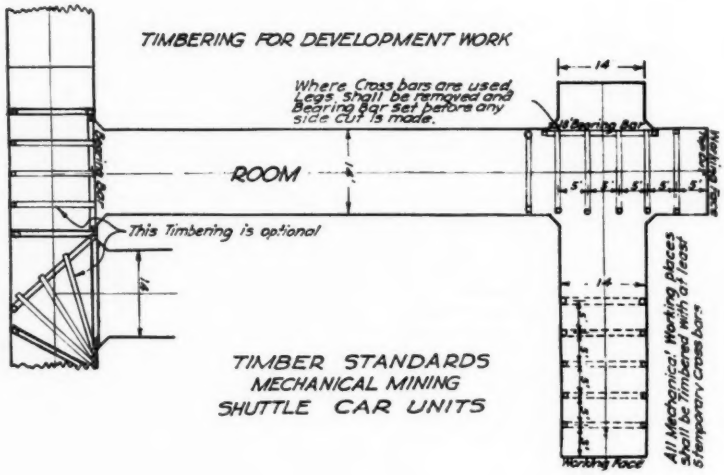
Shuttle car discharging into elevating conveyor which loads mine cars

As shown in Fig. 1, the second and third entries are used as a haulway, with the empty track on the left and the loaded track on the right. The elevating conveyor is located in a breakthrough between these two headings and this cross-cut is started off each entry at an angle so that the connecting track turnouts can be laid on an easy curve. These are left in place for use in the retreat mining. In servicing the loading station, the empty trips are pushed in by the locomotive to a point where they are engaged by a Brown-Fayro rope hoist and, under this arrangement, cars are placed with a minimum of interruption to the shuttle. The map shows an extra entry driven between the two haulways; this is a man-way to provide safe walking, away from the car movement.

The location of the loading station is an important factor and in this mine the arrangement is designed so that the maximum one-way travel of the shuttle car is about 600 ft. At present these stations are located in every fourth cross-cut—a distance of 360 ft. apart but in the No. 10 panel which is now almost ready to start, intermediate stations for retreat work are contemplated which will be half-


GOB LINE
First Cut
STUMP "A"
Two Posts to be set under this end of bar
CENTER SPLIT
GOB LINE
Note:
Timbering Plans shown are for normal conditions and does not relieve the foreman of the Responsibility of additional Timbering wherever necessary.
Bars 1, 2, 3 to be Set before First Cut is made

TIMBERING FOR PILLAR WORK


TIMBERING FOR DEVELOPMENT WORK
Where Cross bars are used, Legs shall be removed and Bearing Bar set before any side CUT is made.
ROOM
This Timbering is optional
All Mechanical Working places shall be Timbered with at least 6 Temporary Cross bars
Working Face

TIMBER STANDARDS
MECHANICAL MINING
SHUTTLE CAR UNITS

way between the regular stations in a right-hand cross-cut. An additional elevating conveyor will be required but this will eliminate the delay now occuring when changing from one station to another. A further purpose will be served by shortening the shuttle haul during the pillar mining. As will be apparent on the map, when the pillar line retreats to the point of cutting off a loading station, the places on the left side of the panel temporarily have a longer shuttle haul than is considered efficient.

In accordance with the state requirements, timbers are placed so that there will be five sets across the loading machine while it is in operation. Each permanent set consists of two round posts with 5x7x14 in. sawed cross bars. Occasionally when heavy roof is encountered, steel H-beams are used to span the room necks to support the ends of the cross bars. During the loading, temporary cross bars on 14-ton screw jacks are placed ahead of the permanent sets as face "safety supports."

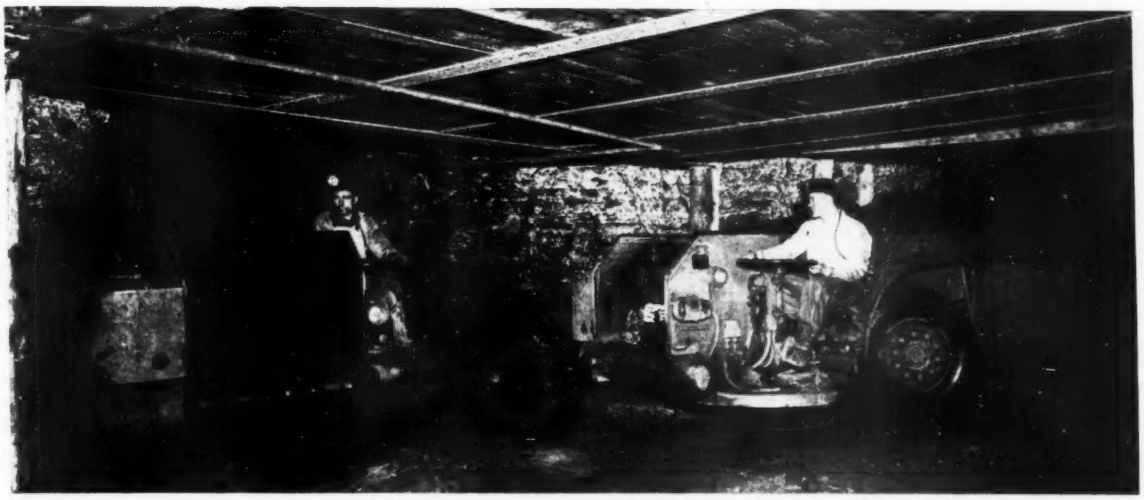
Considerable attention is given to timber recovery in the pillar mining and a high percentage of the posts and cross bars are salvaged and reused. In removing the timbers, a Simplex post puller is used with a special hook that is fastened on the post in such a way that the pull causes the post to turn and twist out under heavy weight.

Electric power is supplied at 250 VDC and sufficient feeder capacity is installed to insure adequate voltage at the working faces. The substation is located on the outside, about one mile from the active workings, and a 6/0 trolley with a 1,000,000 c.m. feeder is brought along the main entry to the intersection of the panel headings. From this point, a 6/0 trolley circuit, with single-rail bonding is used to the shuttle loading station and in addition a 500,000 c.m. feeder is installed to this point. Beyond here, a 4/0 positive and a 4/0 return is taken ahead to a point where the machine cables will reach the face. All machine cables have protective fuses at the nips; the cutting and loading machines use two conductor cables, while the drill has a three-conductor cable, to include a ground wire.

The charging station for the shuttle storage batteries is located just off the main entries and about 1,000 ft. from the intersection of No. 10 right; this consists of a motor generator set mounted on a portable truck so that it can be moved ahead when necessary.

Although the mine is classed as non-gaseous, considerable care is taken to have adequate ventilation to the working faces. A line of concrete tile brattices is constructed during the devolopment in the cross-cuts between the fourth and fifth entries; this forces the air to the furthest in-by workings on the pillar retreat and the ventilation is carried across the active pillar line by curtains in the entries and cross-cuts. Considerable water is encountered in mining but

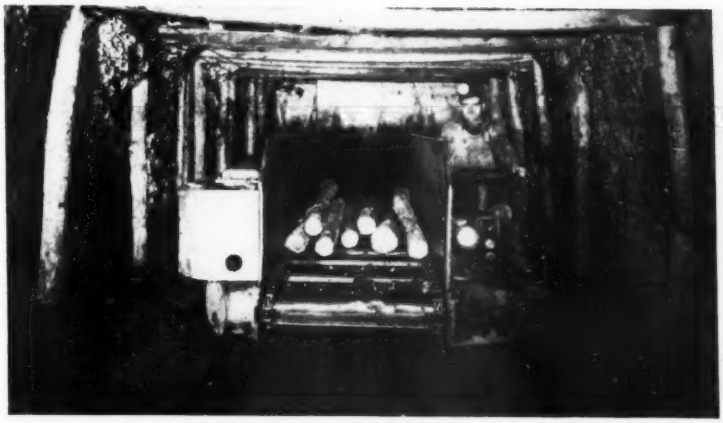
Shuttle car under boom of loading machine



Car changing at the loading machine is accomplished with minimum delay

as a further protection against dust, the coal at the faces is sprinkled during the cutting and, if necessary, during the loading. Pipe lines, bringing water from the outside into the working panel, are extended close to the workings so that only a short length of rubber hose is needed to reach the pipe to the faces. The cutting and loading machines carry a 50-ft. hose as a part of their regular equipment.

Daily inspection and repairs, made between shifts, is a regular practice, supplemented with periodic shop inspection. The tires on the shuttles have given good service and in general, the failures are caused by cuts and abrasions rather than by wear. In order to eliminate side wall cutting, the rib corners at the entry and room necks are slightly rounded to prevent the tires from rubbing against the coal when the shuttle makes a turn; in case a wheel rut develops at the unloading station, which would cause side cutting, the rut is filled with quick-setting cement. The average life of a tire is about one year but one recently replaced had a three-year record.



Shuttle car hauling timbers to working face

Tipple and screening plant at the No. 25 mine, Consolidation Coal Co.

Material Conservation at the Mines

Reports from scattered mining properties show that common sense ideas guided by conventional shop practices are producing unique devices to afford a longer life for mine equipment.

West Virginia

R. H. MORRIS
The Gauley Mountain Coal Co.

WITH the aid of cutting torch and welding machine we are able to salvage supplies and do a great deal of repair work that otherwise could not be done. We are working over old material and using old equipment, such as wood mine cars that we had not expected to use, in other words, are recovering anything available, rather than expecting to purchase new supplies or equipment.

• • •

J. A. SAXE
Island Creek Coal Co., West Virginia

SINCE the present emergency has existed the Island Creek Coal Company has been making special efforts to collect and dispose of all scrap materials in and around the mines. All scrap and worn or broken parts are regularly collected and turned over to a salvage crew of from three to four men who carefully sort the material and turn all unusable material over to a licensed scrap dealer. All parts that can possibly be repaired and reused even at a cost equal to and in some cases greater than the cost of a new part are sent to the machine shop where it is repaired ready for use again.

During the first eight months of 1942, the Island Creek Coal Company salvaged and sold as scrap, 2,048 tons of iron and steel, 65,120 lb. of copper and 23,162 lb. of brass, tin, lead, etc. This, of course, represents an accumulation over a period of years. All worn out and abandoned mine cars and other pieces of equipment that could never be repaired and reused have been scrapped and disposed of.

All riveted plate frogs that have been damaged or broken are sent to the shop and repaired with pieces of broken rails too short for mine use. This has practically eliminated the use of new frogs for replacement use.

All worn shafts and axles are being built up by use of a Metco metal spraying outfit and then turned back to standard size. This method has replaced a great amount of welding and is proving to be a much better method in most cases of shaft and axle repairing.

At the present time experiments are being carried out on renewable rims for certain sprocket wheels that have been worn out. The worn teeth and part of the rim are turned off and a new rim with new teeth are put on and welded. If successful this will save approximately three-fourths of the amount of metal in the original sprocket and cause the replacement of only the outer rim and teeth.

A very large saving of copper is now being made by saving all armature coils of strip copper type from burnt out armatures. All coils are carefully removed, stripped and completely reinsulated and used over again. This has been made possible by the use of a small coil taping machine purchased several months ago. Coils can be salvaged and reused with about 50 per cent of the cost of new coils and is effecting a savings of between 60 and 75 per cent of the former consumption of new copper for this purpose.

The amount of salvage and repair work has increased very greatly due to the large amount of reclaiming of repair parts in an effort to conserve new supplies and in some cases the cost of reclaiming is even greater than the cost of new parts. Due to the shortage of materials and metals this has become necessary in order to aid the war efforts.

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M. K. CLAY
Raleigh Coal & Coke Co., West Virginia

WELDED Trolley Wire — Last year, in reopening three of our drift mines, we found that six miles of trolley wire was needed; one mile of second-hand wire was purchased but we were faced with the necessity of securing the remaining five miles. There was a large amount of scrap trolley wire on hand which had been salvaged from our other mines; this consisted entirely of short pieces ranging from 5 to 20 ft. long and we decided to make our new line from this salvaged material.

The purchase of the quantity of patent splicers needed for rebuilding

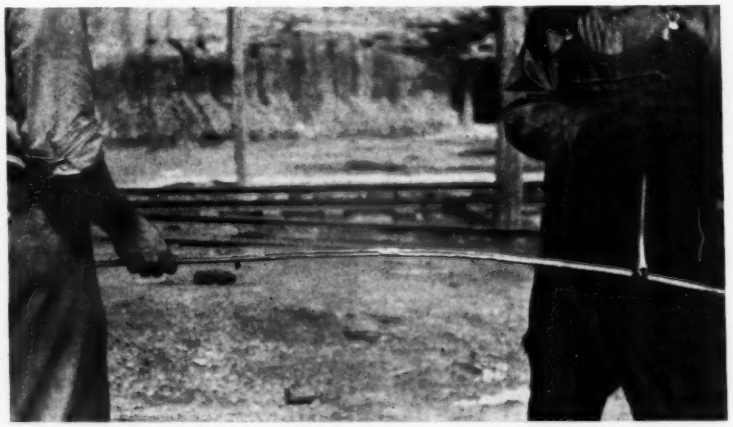

Fig. 1. Making a long trolley wire from short pieces of welding

five miles of wire would have been rather costly; furthermore, the large number of joints would have increased the resistance of the line and would also have made a very rough path for the trolley wheel or shoe. We accordingly decided to use wire welding. Hard solder was tried, as well as foscopper and other low melting temperature rods, but their mechanical strength was too low; the bronze welding rod was used to some extent, but while a good mechanical strength was secured, the joint would break with very little bending. After these experiments, our blacksmith, E. P. Young, tried copper wire, with no flux, for the welding agent and good results were obtained.

The welding wire used was No. 6 gauge recovered from burned-out field coils, well cleaned; the ends of the trolley wire, after cleaning, were placed in a form made for this purpose, and after pre-heating the trolley, the No. 6 wire was melted into the opening between the trolley ends with an acetylene flame. After the weld was cooled, the bottom or wearing side of the wire was filed smooth, leaving the sides and top heavier than the original. One man can easily prepare and weld three joints an hour.

Figure 1 shows a completed weld, and Figure 2 shows how the welded joint will withstand bending. This method has been in service one year and has been so satisfactory that we now plan to go over the other trolley wire in service and replace the splicers by welding.

As a further reclamation method we have made our own trolley hangers for outside track by using double strength pipe which was secured from an old ice plant. This bent into proper shape as is illustrated in Figure 3.

Welded Track—We have approximately two and one-half miles of electric welded 60-lb. track outside, and about four miles inside. After trying several makes of rods and experimenting with welds we decided to leave the angle bars in place and weld them directly to the rail. The joints are first cleaned, which is usually done by the helper, and the welding is made along the angle bars at the top, the bottom and the ends. This type is used on all inside rails and every two and one-half joints on the outside, leaving one-half of the joint for expansion which is necessary on curves. On straight track, more or less expansion may be needed as the condition warrants.

Figure 4 shows the full welded joint, and Figure 5 shows the half

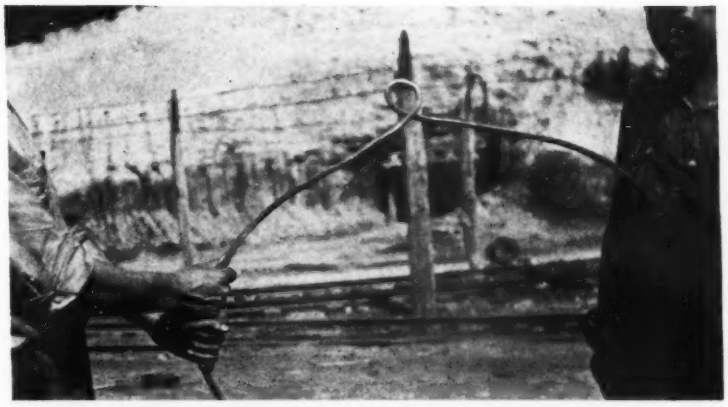

Fig. 2. The welded joint can "take it"

Fig. 3. Pipe from an old ice plant becomes trolley hangers

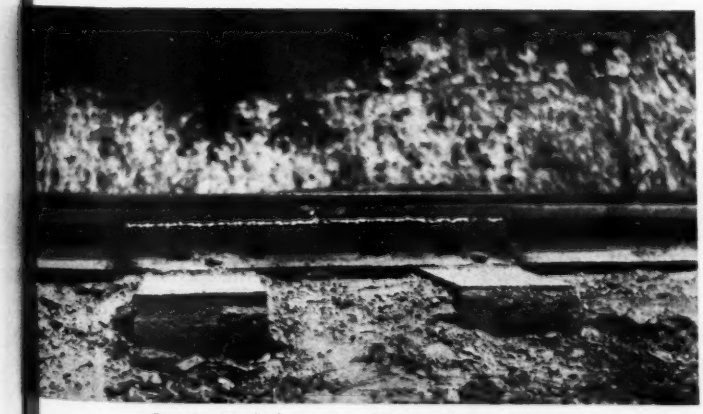

Fig. 4. Angle bars are welded to the rail joint

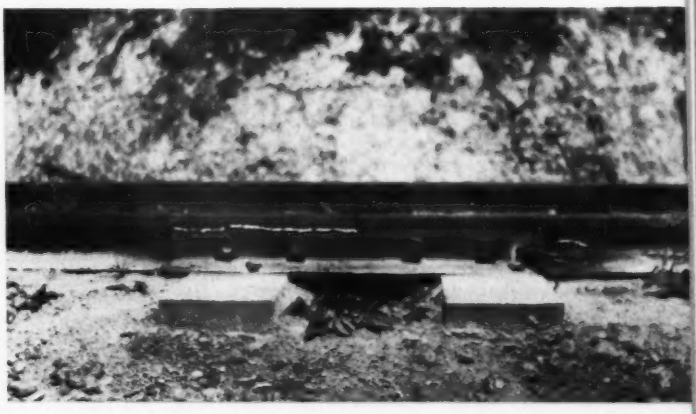

Fig. 5. Outside angle bar is half welded allowing for expansion on curves

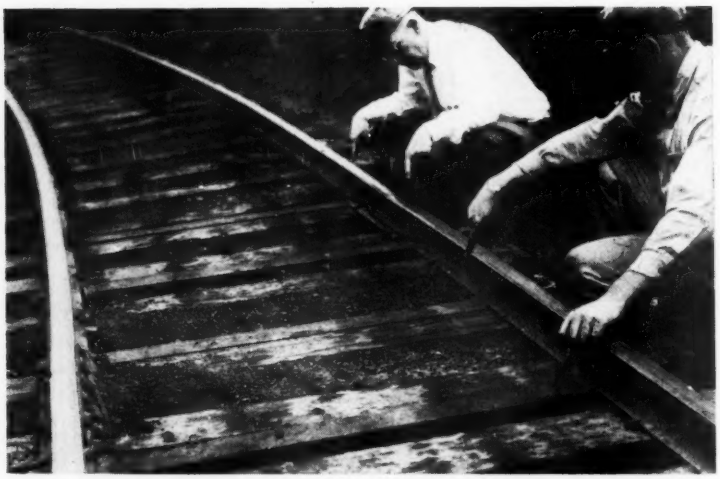

Fig. 6. Pointing out scrap rail welded to track to hold gauge on curves

welded joint used on curves. We also use, on curved track, short lengths of scrap rail which are placed between the ties at a joint and welded to the bottom flange of each track rail. This has been found very efficient in holding the gauge on curves, and it serves a further purpose by eliminating copper wire for cross-bonding. This is illustrated in Figure 6.

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J. O. CREE
West Virginia Engineering Co.

WHERE locomotive and mining machine cables are brought to the shop for vulcanizing new splices, it has always been the practice to cut back a little way from the old break before making a splice and at one mine this rubber is being saved and sold to the government.

Rebuilding locomotive tires by welding is not a new practice, but more companies than ever before are today doing this.

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COMMENTS

RECOVERY of scrap material was increased by the cooperation of the men in gathering up all of the small pieces of copper, brass, bronze, as well as iron and steel to be found in and around the mine. Suitable bins were conveniently placed on the outside and marked for each classification. The men collected bonds, short pieces of wire, used parts, etc., and brought them out in their dinner buckets or in their hands, and in about a week, several hundred pounds of copper, bronze, etc., and several tons of iron and steel were accumulated. Many of the individual pieces weighed only a few ounces, or less.

The life of centrifugal pump casings has been lengthened by one company. When the first leak in the pump appeared, the casing was removed and the hole was stopped by brazing on the inside and at the same time, thin areas were also built up in the same manner. In this way several months of additional life have been secured. The first instance was a necessity in order to make the casing last until a new one was received, and later the method was used to increase the life of the casings.

• • •

OUR company and its official organization has from the beginning of the emergency taken steps to conserve available supplies and materials necessary for continuity of production from our mining operations.

One of our first steps was an intensive check into the existence of obsolete equipment and material. The bulk of this has been disposed of either by reclaiming for use, by sale, or by scrap salvage of steel, cast iron, copper, etc. Surveys of underground workings, active and abandoned, have been made to check all possible recoverable materials and salvage crews of from three to five men have been employed at individual mines to carry through with actual salvage.

Recently, track spikes and all sizes of bolts have been placed on the recovery "must" list. Salvage of all types of steel drums, quick release of wood reels, increased turnover of oxy-acetylene cylinders are items which are being accomplished with more consistent follow-up and renewed vigor. We have substituted wood timbering for steel wherever possible, even on main entries.

A strict, almost miserly control of the issue of mine supplies was put in effect six or eight months ago, when we began a practice of requiring the return to the supply house, of various worn parts for each new part ordered from stock. This was designed primarily to cover special alloy steel shafting and gears, which after being taken to our central repair shop, could be built up by various methods and returned practically the same as new parts. This procedure has now progressed to a degree that makes us feel we are conserving critical materials for our war needs.

We do a considerable amount of this work by welding, spraying, vulcanizing and electroplating. While we hear much of the first three of these processes and know that they have been pretty well developed, electroplating is seldom mentioned. The electroplating field is comparatively limited, yet we have done some interesting work, such as depositing nickel on bearing fits of alloy steel shafts where maximum increase of .009 inches in diameter is needed. We have also salvaged old parts and greatly increased the life of new contact parts for electrical circuit breakers, etc., by electroplating with silver. While silver is still plentiful, the scarcity of nickel may soon curtail the use of this metal.

Metal spraying, especially in building up worn shafts, appears to us to be a very useful method of recovering special alloy steel where such specials are required for unusually hard assignments.

Pennsylvania

W. D. NORTHOVER
J. F. MAZZA
Rochester & Pittsburgh Coal Co.

OUR company has adopted a number of procedures for conserving strategic war materials and the following account outlines some of these practices.

Substitute Materials.—We have substituted some styriene for copper tubing on our tipples with satisfactory results.

Common "tin cans" which are free from rust are used in making the small clips for soldering armature bands, instead of tin plate in 24 in. squares which we formerly used. A solder manufactured by Federated Metals Corporation which contains a very low percentage of tin, has been found very satisfactory.

We are experimenting with compressed fabric liners to replace our brass journal and axle liners and are also experimenting with plastic bushings.

Recovery, Re-use, and Reassembling

of Materials.—A number of our popular size ball bearings have been reground, which we try to use in the machines which have not been recently rebuilt, because we assume that bearings assembled in housings which are worn, will fail prematurely due to hammering. A reground bearing will last approximately as long as a new one under these circumstances.

We have a large number of locomotives in service, from six to twenty tons, and when the axles become excessively worn on the larger locomotives, we cut them down to make axles for the next smaller sizes in cases where this is practical.

All field coils that have failed and are wound with flat copper are rewound on a homemade coil winding machine in our central shop, and reinsulated.

In our own brass foundry we remelt our scrap copper and brass and pour axle and journal liners, pump impellers, bushings, etc.

Large quantities of used bolts have been straightened and re-threaded.

A rail straightening machine has enabled us to recover a large amount of old rails.

We have been replacing crusher segments and large sprockets, formerly made of cast iron, with cast steel fabricated by arc welding from steel plate, so as to build up the worn surfaces with hard surfacing material. This saves us from scrapping the entire castings when they become worn and in a great many instances the building up can be done without dismantling the machines.

Worn bearings fitted on shafts are built up by the metallizing process which is a rapid and efficient method and can be done without damages to heat-treated materials. We also metallize parts subjected to corrosion with corrosion-resistent material. Arc welding is used for rebuilding on many recurrent jobs such as mining machine clutches, journal boxes, and guides, mine car axles, etc.

We are concentrating on the installation of efficient lubricant seals in order to conserve lubricants and increase the length of service of our equipment.

Salvage.—All materials and equipment inside our mines not in active use are sent outside to be sorted; also all inactive materials and equipment on the surface. This is sorted for usable material, repairable material, and scrap. The usable items are put in stock; the repairable portions are sent to shop and repaired, and then listed as usable. All other material that cannot be used or put in shape for use is scrapped. All worn brass bushings and non-usable solid copper wire are sent to machine shops and melted down.

In the matter of gathering scrap, we have had a very enthusiastic campaign in and about our mines since last December. We have placed receptacles (painted red, white and blue) for scrap at convenient points inside the mines, at the tipples, shops, etc. Enthusiasm has been built up largely by printing in plain letters on these receptacles such slogans as "One pound of scrap, one less Jap," "Slap a Jap with a pound of scrap," etc. In all, we have gathered upwards of 350 tons of scrap monthly since last December; 20 percent of this amount or 70 tons monthly has come from the above mentioned scrap receptacles.

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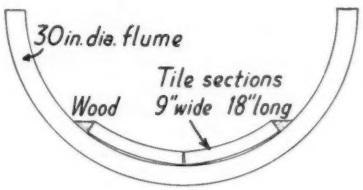
C. D. RUBERT
Lehigh Navigation Coal Co.

HANDLING water is a very serious problem in the anthracite field and our company is using liners to repair worn wooden flumes carrying breaker waste water containing anthracite fines. These liners consist of 2 ft. 9 in. x 18 in. x 1¼ in. thick vitrified clay tile lining laid on bottom and



secured sideways by a wooden strip nailed to bottom of flume. A section of flume is shown on sketch enclosed. We also build stone flumes to carry acid water on surface away from mine openings in place of wood or other strategic materials; this applies only where laid on surface.

Old slow speed motors are utilized for new or emergency pumping units by using a speed increaser with high speed pumps.

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F. B. DUNBAR
Mather Collieries

WE are putting forth every effort to reclaim all kinds of material, especially steel, and are recovering rails, spikes, cross bars, steel ties, and pipe from the mine and surface plant. Heretofore our practice was to use 25-lb. T rail under the head coal for cross bars but we are now substituting 3-in. oak plank for this purpose.

A salvage campaign has been carried on in our village, using the Boy Scouts and other children, in picking up all kinds of scrap, including tin cans. This is delivered to the office every Saturday where we pay ½-cent per pound for scrap iron, tin, etc., 5 cents for brass or copper, 1 cent for rubber. It is surprising the amount of material these children gather each week. There is of course no profit to us and the weighing and paying is quite a trouble, but the campaign has brought in tons of material that otherwise would have gone on the garbage dump.

So far, we have not found any method for salvaging rubber insulation from scrap wire and cables, but recently I saw an illustration, from the Timken Roller Bearing Company, showing a device, consisting of a set of rolls, used for splitting the rubber from the wire. This seemed to be very efficient but I do not believe that any one mine has enough recoverable rubber to justify such a machine. However, this is something that might be looked into by the government; if all the scrap cable in a mining district were sent to a central point, there would be quite a large amount of rubber that could be salvaged.

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A. LEE BARRETT
Pittsburgh Coal Company

THE FOLLOWING is a brief outline of some of the practices being used by our company in conserving and reclaiming material and supplies. Generally, such practices may be classified in five general categories as follows:

1. Ordinary welding.
2. Brazing.
3. Welding of alloy material with alloy rods followed by stress relieving and heat treating.
4. Metallizing.
5. Flame Hardening.

Under ordinary welding comes a wide variety of repairs. Rebuilding of cutting machine parts, locomotive parts, loading machine parts, and other items too numerous to mention. In general, the procedure followed is to build up the broken or worn parts with an electrode which will give the maximum hardness practical for good machining practice without annealing. The parts are then machined or finished and put back in service usually giving a large part of their original life. Wearing points are sometimes hard surfaced to give additional life.

Brazing is used on parts made of material other than steel and highly satisfactory salvage jobs can be accomplished by its use. This is particularly applicable to pump parts and cast iron locomotive frame heads. This process is most applicable where strength is required without a great deal of hardness.

A new class of repair is being effected by the use of welding alloy material with alloy electrodes and stress relieving or heat treating or both. This enables high strength parts such as locomotive axles, armature shafts, conveyor chains, caterpillar chains, cutting machine chains, and many other parts which need to be both strong and hard to be welded with an alloy rod which would without annealing be too hard to machine.

However, with annealing and stress relieving the part may be properly machined after which it can be given a heat treatment restoring to it the original hardness or strength properties of the parts.

Metallizing also opened up a considerable field in salvage and repairing parts. Either high or low strength material may be handled by this process whether they be ferrous or non-ferrous. The work is prepared by shot blasting or grooving after which molten metal is sprayed on the part to the desired thickness. In the case of shafting it is usually done in a lathe or in the case of pumps, odd shaped items, the metallizing gun is hand held. The metallic coating goes on without appreciably raising the temperature of the part being repaired. Consequently no stress disturbances are set up in the part and it may be put back in service without fear of breakage. A material may be selected having almost any characteristic which is felt to be desirable. Thus the finished surface may be soft, extremely hard, machinable, grindable, ferrous or non-ferrous as desired.

Flame-hardening, too, has opened up a new field in repair and salvage work. Either large or small parts may be welded with an electrode depositing material having a carbon content of .35 or .40. Usually this weld must be stress relieved or annealed and after machining the part may be flame-hardened in local areas to provide a good wear resisting surface backed up by a strong tough core. This is especially useful on repair work involving quills, sprockets, and chain parts. As an example of the repair work done at this plant by welding—approximately 65 tons of welding electrode a year is used on the various machine parts salvaged at the Pittsburgh Coal Company shops.

Virginia

J. D. ROGERS
Stonega Coke and Coal Co.

Scrap Salvage

WE enlisted the services of our Boy Scouts in collecting scrap material from homes, creek banks, etc., and gave them the money received for the salvage, which netted them a very nice little sum. We also put on a drive to reclaim the scrap inside our mines, the miners bringing it to the outside on mantrips, and depositing it at appropriate points; this also brought about the accumulation of several tons of scrap metal. To publicize the scrap collecting campaign we used a 22 x 14-in. poster, attractive in make-up, with the wording above.

HELP NEEDED

YOUR GOVERNMENT AND YOUR SOLDIERS NEED YOUR HELP!

STEEL IS NEEDED FOR GUNS, TANKS, BOMBS AND SHELLS

YOU TOO CAN HELP!

COLLECT METAL SCRAP IN AND AROUND THE MINES AND BRING IT OUT IN THE MANTRIP. NO PIECE TOO SMALL TO SAVE. DEPOSIT IN BINS PROVIDED AT SUITABLE PLACES. WHEN A TRUCKLOAD IS COLLECTED WE WILL START IT ON ITS WAY TO MEET THE JAPS.

Kentucky

J. T. PARKER
Inland Steel Company

FOR the past few years we have been trying in all possible cases to reclaim any worn or broken part, and now employ five full time welders and three apprentice machinists, who spend a large part of their time in rebuilding and refinishing worn parts. The material reclaimed is of all types, and it would be difficult to estimate what the saving in the requirements of new steel would be. In general I would say that nothing is scrapped that can be put back in serviceable condition within a reasonable cost.

To date, we have recovered approximately 250 tons of scrap iron which has been shipped to the steel mills.

Illinois

F. EARLE SNARR
Chicago, Wilmington & Franklin Coal Co.

RECLAIMING used material and rebuilding worn parts has been part of our operating program for the past several years. During normal times we gaged our activities along such lines by the yardstick of strict economy. Today we are continually expanding our salvage and reclaiming program to include all materials vital to the war effort and by extending the useful life of equipment, we eliminate new purchases whenever reasonable or practical.

Locomotive axles are built up by electric welding through the journal areas and turned down in a lathe to original dimensions. A direct saving in axle cost is realized, steel is conserved and machine tools are released for other work through the less amount of time required to turn a new shaft and cut keyways as against turning down the built up area. Motor armature shafts are built up and turned down to original dimension without removing shaft from the armature. Shafting and axles of numerous types are rebuilt as good as new by this method.

Large castings used in locomotives, cutting and loading machines, which are held in position by stud bolts, are made suitable for re-use by either electric or acetylene welding of breaks and by filling up the stud holes with bronze, then redrilling and tapping to original size and centers. New threads are placed on mine car axles by building up with bronze and rethreading. Mine car axles of heat-treated, alloy steels are salvaged from worn out cars and made into mining machine shafting of smaller diameters or shorter lengths.

Heavy cut tooth spur gears which have one or several teeth broken by foreign material entering the mesh, but otherwise having considerable life, are repaired. When only the ends of the teeth are broken off, they are built up by acetylene welding and restored to original tooth shape by means of a die of proper contour. In cases where one or two teeth are broken across the entire face, the remainder of the broken tooth is leveled off and a line of holes is drilled across the gear on the centerline of the tooth; these are tapped and studs are inserted, after which the tooth is built up to proper contour.

We have materially reduced the volume of replacements in stainless steel woven wire screen cloth on dewatering screens in our washeries, by patching the torn area with similar cloth from discarded screens. We use a

special stainless steel soldering flux with soft solder and have found the patched area usually outlasts the rest of the screen cloth.

The manner in which our repair and maintenance men have entered into the battle of conserving critical material and supplies is most commendable, with the result that scarcely a week passes but what we find a new kink being tried out which will put a piece of machinery back into service that formerly went to the scrap pile.

Maintenance methods play an important part in our conservation of materials program. While it is very important to devise means of repairing or reconditioning equipment after it has failed, we have found that close inspection of the conditions under which the equipment operates, affords an equal field for savings. Bin gates, loading chutes and skirt plates on belt conveyor systems must be carefully maintained to prevent misplacement and consequent cutting of rubber belting. Better lubrication and periodical inspection of bearings; prompt changing of a gear or shafting, the failure of which would probably cause the destruction of a whole assembly, are details which pay dividends in normal times, but can help win a war now.

C. C. CONWAY
Consolidated Coal Company

OUR conservation program is built chiefly around processes for welding, spraying and vulcanizing. Alloy steels are now very difficult to obtain and we have been very successful in recovering worn parts, particularly shafting for all types of equipment, by means of metallizing. Other parts recovered by metallizing are pump impellers, motor end housings, piston rods, and boiler blow-down valves.

Abrasion resisting steels are practically unobtainable so we have, of course, substituted mild steel and our very meager stock of abrasion resisting metal is being used only at the most vital wearing points. Most of our substitution has been made with inferior materials and I know of no instance where a substitute has had any advantage, other than that it was obtainable.

It appears to me that the greatest aid to conservation would be an educational program designed to teach the men who operate equipment, the necessity of refraining from abusing or overloading their machines. As an example, the load on a short-wall cutter is largely controlled by the condition of the bits and by the thoroughness with which the helper or shoveler removes the cuttings. The machine parts are of critical metal and as the wear is a function of the load, it is obvious that a good shoveler is conserving war materials. The effectiveness of such a program, instituted by ourselves, is partially offset by the suspicion that we have selfish motives, (which is perhaps partially correct) and a systematic program by the War Production Board might receive more consideration.

Wyoming

GEORGE B. PRYDE
The Union Pacific Coal Co.

WE do a great deal of reclamation work in the way of building up locomotive and pit car wheels and locomotive angles, reinforcing conveyor pans, and reclaiming practically all types of mining machines, including gears, shafts, etc. We also splice and vulcanize cables, in fact everything possible is done to cut down the purchase of new material which is difficult to get at this time.

TARGET FOR TONIGHT

. . . Your Business?

Maybe they won't actually come and drop a *bomb* on your business, but the Axis war lords have their eye on it, just the same. They want to wipe it out as a competitive force—or take it over lock, stock, and barrel. Here is a threat that you can reply to *now*, today, and in no uncertain terms—by buying War Bonds to the very limit of your powers, that our armed forces may have the guns, tanks, and planes they need to crush the Axis *once and for all.*

THE GOAL: 10% OF EVERYONE'S INCOME IN WAR BONDS

Every American wants the chance to help win this war. When you install the Pay-Roll War Savings Plan (approved by organized labor), you give your employees that chance. For details of the plan, which provides for the systematic purchase of War Bonds by voluntary pay-roll allotments, write: Treasury Department, Section S, 709 12th St. NW., Washington, D. C.

EVERYBODY EVERY PAYDAY 10%

Buy War Savings Bonds

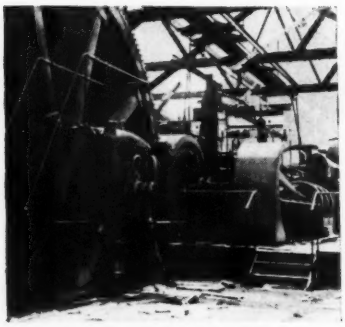
This space is a contribution to America's All-Out War Program by

MINING CONGRESS JOURNAL

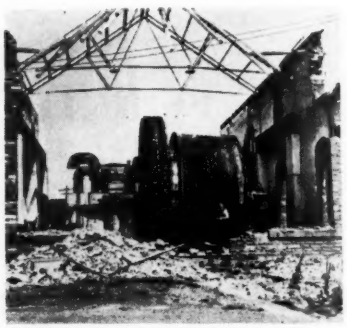
Scrap * Scrap * Scrap

25,000 Tons Collected From Old Copper Mines in Michigan

Scrap from an old Michigan copper mine filled 13 railroad cars



Virtually a scrap dealer's heaven



Of no use in today's mining

General sorting yard for scrap and useful material

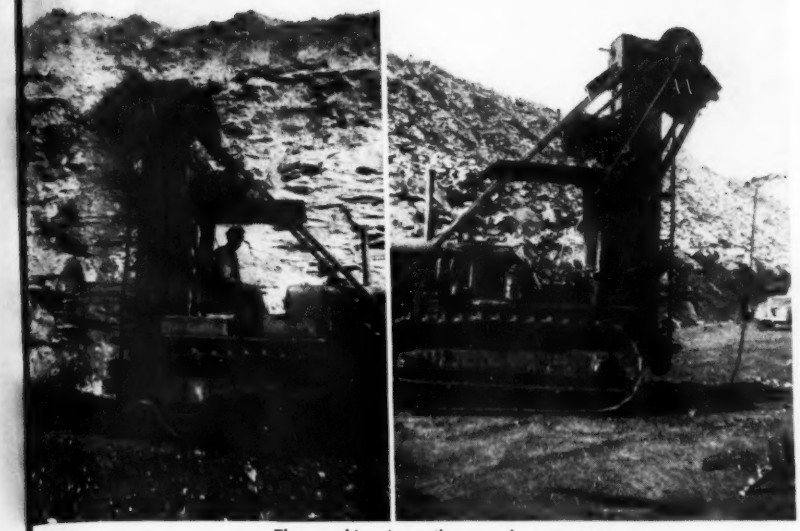
★

DISMANTLING old hoisting equipment, boiler plants, steel head frames and many buildings in the "old time" copper mining areas in Michigan is providing a substantial volume of scrap for ships, tanks, guns and other war materials. The Calumet & Hecla Consolidated Mining Company and other mining companies in the Michigan copper country are carefully appraising every bit of old equipment at several abandoned copper mines to determine which is scrap and which is usable machinery. The volume of scrap so far recovered from these old Michigan properties is estimated to be around 25,000 tons.

All this work has been under the direction of E. R. Lovell, general manager of Calumet & Hecla. He is also acting as chairman of the Industrial Salvage Committee in the Michigan copper country and is stimulating the recovery of scrap from other mining companies in the district.

Scrap collection in the metal mining industry is now well under way with salvage committees established in the various metal mining states, and metal mines over the country are energetically collecting every pound of scrap possible.

Calumet & Hecla is building a tailings plant for a neighboring copper producer and they have been able to obtain and utilize from old surface buildings, some equipment and supplies for this tailings plant.



The machine is easily moved on tractors

Coal Pinning Machine*

Pile driving technique is employed to break coal in thin seam strip mining.

By C. M. GUTHRIE
Supt. Seneca Coal & Coke Co.

AT THE Catoosa Mine of the Seneca Coal & Coke Company, located in Wagoner County, Oklahoma, we load an 18-in. vein of coal with two 11-BU Joy Loaders into 20-ton trailers. The problem of shooting and breaking this coal for loading was a very serious and expensive problem and about a year or 16 months ago our chief mechanic came to us with an idea for a coal pinning machine. After much thought we finally developed this to its present status, which, in effect, is a modified pile driver, using a sharp pin to break the coal.

We use an R-5 Caterpillar Tractor for power and have mounted on the rear of this tractor a 10-ft. vertical tower 16½ in. square. The corners on this tower are made of 6 by 6 by ¾ in. angles with ¼ in. plates forming the box. We made, in our shop, a right-angle gear-box of 1 to 1 ratio at the power takeoff end of the tractor, which through a direct connected shaft, drives a Foote Brothers Model 20-W 8½ to 1 ratio gear-reducer. At 600 r.p.m. it delivers 14½ h.p. and through a Baldwin 140-D roller-chain on 5-ft. centers, drives a lifting chain (another 140-D type) which extends the length of the 10-ft. tower. We use a 16½ in. square 4,300 lb. weight, with a 3½ in. diameter, 18 in. long spike pin extending from the center of the lower face.

The lifting chain, by means of a lug link engaging a lug on the weight, raises the weight to 10 ft. to the tower top. As the lug link passes around the chain sprocket, the weight is disengaged and falls by gravity, driving the pin into the seam and breaking the coal, making about six breaks per minute. When the pin is pulled from the coal, there is quite a bit of friction, causing a severe shock, which is taken care of by the spring mounted sprocket at the upper end of the vertical tower.

In the operation we have found that we can strike an average of about six strokes per minute on our particular seam, which is about 18 in. thick and the coal being very soft and fragile does not lend itself easily to pinning. In dropping the pin six times per minute on a seven-hour shift, with two of these machines we have been able to hold a daily average tonnage of about 1,750 tons per day. This machine has great flexibility; we can work either traveling forward or backing up, or, if we happen to find a tight piece of coal when the loader comes along, the pinning machine can back up and repin this section. In the case of too large a chunk, the operator of the machine can slew around, back over the lump and split it again.

We have found that we can go along ahead of our loaders for quite some distance, and in most coal pits I think this advance pinning will be a matter of trial and error of the pinability of different seams in different fields. We have been able to keep ahead of our loaders in good shape and keep them in plenty of loose coal at all times.

By the use of these two pinning machines we were able to eliminate two air compressors, four jack hammers, and the use of all explosives on our coal face. This has proven very profitable, besides increasing our tonnage. Since the installation of our machines, there have been a number of our neighbors in the southwestern field who have built machines of their own and put them in operation and I think most of them have been very well satisfied. The machine has been of an advantage to them, by increasing their tonnage, cutting down some of their cost, and solved some of the problems of loading more tonnage from their pits.

Truck, loader and pinning machine in the background

* Presented at the 19th Annual Coal Convention, American Mining Congress, Cincinnati, Ohio.

BRAZIL'S

Strategic Mineral Resources*

The first South American country at war against the Axis has ore deposits of considerable potential wealth, some of which are being developed with the help of American engineers.

BRAZIL is rich in the minerals we need now and this wealth has become one of our most important sources for many mineral products, such as mica, quartz crystals, industrial diamonds, iron and manganese ore, and the rarer metals. Brazil's mineral exports to the United States have been doubled during the last few years. Expansion of existing mines and the opening up of new ones now in progress is a vital factor both in our war effort and in making the Western Hemisphere less dependent upon sources in the Eastern Hemisphere. A full story of the mounting progress and future possibilities in the output of strategic minerals in Brazil would fill many pages and in this brief space only the current highlights can be given. For additional data the reader is referred to the *Foreign Minerals Quarterly* of June, 1941, issued by the United States Bureau of Mines, and an article on Brazil in the August number of *Engineering and Mining Journal*, by Emilio A. Teixeria.

The Ferrous Industries

Iron constitutes Brazil's biggest and largest mineral reserve, estimated at 15 billion tons, and its iron ore is in urgent demand by both Great Britain and the United States. Exports of this high-grade product are limited to about 400,000 tons a year as railway transport facilities are inadequate. Recently an agreement was made between the Brazilian Government and the Export-Import Bank for a loan of $14,000,000 to equip the Victoria-Minas Railway and the Itabira mine with rolling stock and machinery for an output of 1,500,000 tons a year. Work on this project is now under way and should be completed in 1943.

For many decades Brazil has been a producer of iron and steel products in small charcoal furnaces from the local high-grade iron ores. Today there are 14 such plants in operation with an output of 180,000 tons of pig iron and 120,000 tons of steel. Brazil's consumption of steel products is over 300,000 tons, and to meet the increasing demand the construction of a National Steel Plant was started in 1941 at Volta Redonda, in the State of Rio de Janeiro. This will have an annual capacity of 300,000 tons and if the necessary equipment can be delivered on schedule the plant should be in operation in 1944. The total cost of the plant is about $45,000,000, and of this amount $20,000,000 has been loaned to the Brazilian Government by the Export-Import Bank to cover equipment from the United States. With this plant in operation Brazil will be in position to produce most of her iron and steel requirements and to export to neighboring countries.

Next in importance are Brazil's manganese deposits. These are widely

Caue Peak in the background is estimated to contain a tremendous tonnage of high grade iron ore

* By Charles Will Wright, Chief Technical Consultant, Metals and Minerals Division, B. E. W.

scattered in the States of Minas Gerais, Matto Grosso, and Bahia. Present output is largely confined to the Morro da Mina and other mines tributary to the Central of Brazil Railway, which is the bottleneck controlling shipments. Efforts are under way to improve transport facilities over this line as well as loading facilities at the docks in Rio de Janeiro. In the meantime investigations of the Lageado manganese deposits not far from the port of Santos, at Nazareth near the port of Bahia, and in the western part of Minas Gerais are being made with encouraging results.

In Matto Grosso, near Corumba, is one of the world's largest undeveloped deposits of high-grade manganese ore. This deposit is estimated to contain from twenty to thirty million tons. The ore is now being mined and shipped in barges 1,200 miles down the Paraguay River to Montevideo, where it is loaded into ocean-going steamers. About 2,000 tons a month are now being exported and plans are in progress to increase these exports.

Of the total current manganese output from Brazil, two-thirds comes from the Morro da Mina mine of the Cia. Meridional de Mineracao, a subsidiary of the U. S. Steel Corp. This mine lies just east of the Central Railway near Lafayette. Present output averages 20,000 tons a month, but with adequate transport the output of this large open-cut mine could be more than doubled. Reserves at the mine are said to be about 4,000,000 tons. The A. Thun & Co. have another group of manganese mines east of the Central Railway which yield about 6,000 tons a month.

With increased transport facilities on the Central Railway and improvements in loading facilities at the docks in Rio de Janeiro estimates indicate that, ships being available, exports of manganese ore from Brazil could be doubled.

The principal chromite deposits in Brazil are at Campo Formoso and at Santa Luzia, in the State of Bahia, situated 270 and 180 miles from the port of Sao Salvador. Although they were worked extensively during the first World War, these sources at the present time are not yielding the tonnages expected from them, partly due to transport facilities and partly to the grade of the chromite. Transportation and concentration are the main problems in the exploitation of these deposits and these problems are now being studied. The estimates of ore reserves in these areas vary from 200,000 to 300,000 tons.

Of outstanding importance is the latest prospecting and exploration work done on the large nickel deposit in the Sao Jose do Tocantin region, situated 200 miles north of Anapolis, the end of the railway in the State of Goiaz. Results indicate that this deposit can be considered as one of the largest nickel deposits in the world. Ore estimates indicate many millions of tons of ore, principally garnierite, with an average of over 5 per cent nickel. The Tocantins Nickel Company, composed of local Brazilian capital, has recently been formed to install a pilot metallurgical plant and to develop the property.

The Wigg, Brazil's first charcoal-iron blast furnace is still operating

Overlying this nickel deposit are scattered areas of a secondary cobalt ore which, up to the time war was declared against Japan, was being mined, transported in trucks to Anapolis and shipped from Santos by a Japanese firm at the rate of 40 tons of 5 per cent cobalt ore a month. Last year a plant was constructed with sorting floors and jigs to increase output to 10 tons a day, but this was never operated. A detailed description of the occurrence of nickel and cobalt is contained in *Mineral Trade Notes*, October, 1941, issued by the United States Bureau of Mines.

At Livramento, in Minas Gerais, the Cia. Brazileira de Nickel is mining a garnierite deposit and treating it in a 20-ton electric furnace to produce a 20 per cent ferronickel at the rate of a ton a day. Another nickel property is at Ipanema, in Espirito Santo, which has been partly drilled with ore reserve estimates indicating 1,600,000 tons of about 2 per cent nickel content.

The Nonferrous Metal Deposits

Large deposits of copper, lead, and zinc are lacking in Brazil and most attempts to develop the known small occurrences have been unsuccessful. An exception, however, is the lead smelter at Palmital, in San Paulo, built by the State and put into operation last year. The lead mines at Apiai and Iporanga supply the concentrates for this plant and the output already supplies Brazil with a considerable portion of her lead requirements, which are from 10,000 to 12,000 tons a year.

The most important copper deposit is at Camaquan, in Rio Grande do Sul. This property was developed and operated by a Belgian company for some years and abandoned in 1908. In recent years this deposit was drilled by a Brazilian company, the ore reserve estimates being 50,000 tons of probable ore containing 5 per

Pig iron spout of the Wigg, with earth moulds in foreground operated by the Cia. Meridional de Mineracao

Mining manganese ore at the Morro da Mina Mine, the largest producer in Brazil

cent copper. The Brazilian Government is carrying on investigations of this deposit, as well as on other copper prospects in Bahia and Parahyba.

Other Metals

Extensive areas of bauxite have been explored in the States of Minas Gerais and Espirito Santo, the most important being those at Pocos de Caldas in Minas Gerais, with estimated ore reserves of 1,500,000 tons. This property is owned by the Cia. Geral de Minas. For some years from 12,000 to 18,000 tons a year of selected bauxite has been exported to Argentina for the manufacture of aluminum sulfate for purification of water at city reservoirs and for aluminous quick-setting cements. In 1941 a contract for 100,000 tons was made with the Reynolds Metal Co. and some 18,000 tons of ore averaging 59 per cent Al_2O_3 were shipped to Santos.

Another important deposit is the Lindolpho Dias, now owned by the Cia. Brasileira de Aluminio, which company plans to build a plant near Sorocaba, in Sao Paulo, to produce aluminum metal.

Other deposits are Motuca, owned by the St. John del Rey Mining Co.; the Gamba, near Ouro Preto; and Chapasao do Canga, all in Minas Gerais, and the Muquy deposit in Espirito Santo. The total bauxite reserves in Brazil are estimated at 20,000,000 tons.

Brazil, long noted for its production of the gem stone aquamarine or clear beryl, has now become an important source of beryllium since that metal assumed its place in the galaxy of super-alloy metals. The extensive mica-bearing pegmatites of Minas Gerais do not contain much beryl, the commercial production coming chiefly from the pegmatites of the "eastern nose" of Brazil, particularly from the States of Paraiba and Rio Grande do Norte. There is some production in the State of Ceara, on the northern side of the nose. Being a pegmatite mineral, beryl may be found in any of the northeasterly band of states having pegmatite formation but the important commercial production is limited to the three above-mentioned areas. The output for the ensuing year will range between 2,500 and 3,500 tons of beryl depending on the availability of mining supplies and shipping.

Columbite and tantalite have been known in Brazil for a number of years, but important production was not secured until 1938. The principal discovery thus far has been on the boundary between the States of Rio Grande do Norte and Paraiba in the vicinity of Jardim do Serido and Acari, where exploitation of the pegmatites is proceeding as rapidly as possible. Other occurrences are reported in the States of Para, Minas Gerais, and Pernambuco. Production in 1939 and 1940 of these two minerals, as reported in the "Relacao das Condiciones Geograficas, Economicas e Sociais" was: tantalite, 1939, 24,271 kgs.; 1940, 27,117 kgs., and columbite, 1939, 34,822 kgs.; 1940, 15,269 kgs.

Production in 1941 of tantalite was approximately 60 metric tons, while that for columbite was only 3.6 metric tons. Production for 1942 is expected to reach 100 tons for tantalite. Nineteen forty-three is expected to be the year in which Brazil produces more high-grade tantalite than the rest of the world. Thus in a period of less than five years Brazil has risen from minor fourth place tantalite producer to first place. It is expected that columbite production from this country will be expanded to give important tonnages.

Another mineral product from Brazil is monazite sand which contains 25 to 35 per cent cerium, 6 to 8 per cent thorium and other rare metals used in searchlight carbons, radio tube filaments, incandescent gas mantles, etc. These sands occur along the beaches in Bahia associated with ilmenite and zircon. Current production is at the rate of about 1,400 metric tons a year and could readily be increased to meet United States consumption requirements.

The production of rutile (natural titanium oxide) started in 1933 in the remote State of Goiaz. It occurs in stream and bench placer deposits and is recovered almost entirely by prospectors or "garimpeiros" by shovel and panning operations. This mineral is used principally in welding rods coatings and is of growing importance in the armament program. Production has jumped from 490 tons

Hydraulic washing of bench deposit at the Mina Serrinha, Ltd. Diamantina district

in 1939 to 2,500 tons in 1941. The principal sources are in Ceara, Goiaz and Minas Gerais. The product which is sold to local dealers contains about 95 per cent titanium oxide although grades as low as 70 per cent are being accepted. Present price f. o. b. shipping port is $170 a ton.

Nonmetallic Mineral Industries

The demand for industrial diamonds from Brazil has shown a big increase during the last year and with higher prices output has increased. In 1941, 235,000 carats were exported.

The principal producing areas are at Diamantina in Minas Gerais, the Cuyaba area in Matto Grosso and along the Rio Paraguassu in Bahia. All of the diamonds are mined from river bed or bench deposits and for the most part by "garimpeiros" with pick shovel and pan. However, at the Mina Serrinha several hundred cubic yards of gravel a day are being mined by hydraulic giants and delivered in launders to a concentrator with jigs and a concentrating table. For each 100 cubic yards so mined and treated an average of 1 carat is produced. Of great interest in 1939 was the discovery of the "President Vargas" diamond weighing 724 carats found in the Santo Antonio River near Coromandal in Minas Gerais. This discovery caused a real sensation in the diamond world.

When the war began Brazil was the chief producer of industrial diamonds not owned or controlled by the Allies; in consequence, Germany, Italy and Japan, through their brokers, began to buy practically all of Brazil's production. Competitive buying, by December, 1939, had doubled normal prices and marginal diamond producers became prosperous. At the new prices, neither industrials nor cut-

Unloading and washing diamond bearing gravels

Washing a pan containing industrial diamonds

After washing in pan with fine screen bottom, the material is dumped on a pile and from the concentrate on top the diamonds are picked out by hand

tables were attractive purchases to American brokers. Nor were the Axis brokers reported to be above purchasing unregistered stones.

So tempting were the Brazilian prices that it is rumored that South African stones smuggled out of the United States were appearing on the Brazilian market late in 1941.

Production of mica has increased greatly since 1936, and Brazil is now the world's second largest exporter of muscovite mica. Nearly 2,000,000 pounds were exported in 1941. The principal mica producing areas of Brazil are in the State of Minas Gerais but pegmatite rocks, in which

Trimming books of mica at the Chalet Mine in Espera Feliz

the "white" mica of commerce occurs, are known in a northeasterly band of States from Santa Catarina to Ceara on the north coast. The most important districts in Minas Gerais are Figueira (or Governador Valadares) and Espera Feliz. The former accounts for about 60 to 70 per cent of the Brazilian output.

The Brazilian pegmatites are remarkable for their weathered, decomposed tops that facilitate easy and cheap mining with pick, shovel and wheelbarrow, notably in the Espera Feliz district. Here much of the ground can also be moved by bulldozers, gloryholing or similar mass methods. More hardrock mines are found in the Figueira area where compressors and mechanical drills are needed. On the whole, however, mica mining is conducted by primitive methods, as nearly everywhere else in the world. This type of mining is now being replaced by mechanical equipment and more systematic mining methods.

Brazilian output was affected by several hectic speculative periods in 1941, and in the early part of 1942, before the consummation of a trade agreement between the United States and Brazil whereby all exportable mica is being purchased by Metals Reserve Company. Another important change in the Brazilian industry was in the preparation of the product to conform with higher standards of trimming and qualification. For a period in 1942 only qualified mica was accepted for export but this proved too great a strain on the facilities and customs of the trade, and in the latter half of the year, dealers were permitted to sell either qualified or mixed mica. Some part-trimmed mica was also purchased.

Brazil is the only important source of piezo-electric quartz crystal for use in radio frequency control. A substantial increase in the demand has resulted in marked expansion of the quartz mining industry.

One of the most important producing districts is situated northwest of Bello Horizonte near Sete Lagoas, State of Minas Gerais. There the quartz crystals are mined principally from residual deposits of decomposed granitic rock. The larger producers have facilities at or near the mines for testing and grading their product prior to shipment.

The quartz mining industry as a whole comprises numerous small or individual operations worked by primitive methods. This is especially true of the outlying districts in the States of Bahia and Goiaz which, however, account for a substantial percentage of the total Brazilian production. Only a small portion of the crytals mined are suitable for fabrication into radio oscillators.

Brazilian exports of quartz crystal during 1941 are reported as 1,980,000 kilograms, valued at $4,450,000.

The character of the deposits of zirconium in Brazil are of two types. In Espirito Santo on the beaches are found sand deposits containing zircon, rutile, ilmenite, and monazite. The zircon from this source is a stained material which is reported as not being as desirable as sands secured from other sources.

Zircite, or baddeleyite, found in the Pocos de Caldas plateau in the State of Minas Gerais, is the only known occurrence of this type of deposit. Here the oxide mineral is found as pebbles and small boulders in gravel beds. This material is cleaned from the gravel by primitive mining methods. Products are secured which will give 65 to 75 per cent ZrO_2 and 75 to 95 per cent ZrO_2. Reserves of these gravel deposits have been estimated as high as 2,000,000 tons. These baddeleyite deposits are of particular importance in the war program, since the mineral is used in the production of ferro-zirconium and specialized oxide manufacture.

Other Minerals

Among the other minerals produced in Brazil are asbestos, which is being mined at Bom Jesus in the State of Bahia. The annual output is about 200 tons which is shipped to the cement manufacturing plant in Sao Paulo. No spinning fiber is made.

Extensive high-grade deposits of magnesite estimated to contain 10 million tons are being explored by the Magnesite S. A. some 80 miles from the railway station of Jequie in southern Bahia. Eventually this deposit may become an important source of refractory material for the steel plants.

Conclusions

Brazil has a greater variety and larger quantity of mineral products than most South American republics, but because of inadequate transportation facilities from mines to seaboard, only the more favorably situated properties have been exploited.

Efforts are being made to improve the railways and acquire additional rolling stocks but priority difficulties

have been a retarding factor. For the more valuable products such as mica, quartz crystals and tantalite cargo planes are being considered. Mine developments in Brazil would have been more extensive in recent years had the new mining code been less drastic against foreign capital investment. This, too, is now being revised to encourage mine development by foreign mining companies as well as to interest local capital in mining enterprises.

Present demand for strategic and other minerals by the United States has injected a growing interest in Brazil to do a more serious job of prospecting, exploration, development and mining. Much encouragement and aid in this work is being given by the engineers and geologists sent by the United States Government to assist in the study of mine development and improvements in mining and treatment methods also by the Metals Reserve Company in the sampling market preparation and purchase of the mineral products. The cooperation between Brazilian officials and those of the United States and the pooling of technical knowledge is resulting in the expansion of the mining industries with increased output and reduced production costs. There is no doubt of the opportunities in the mining field in this part of the world providing roads can be built and money becomes available to development of mines. Such developments can best be accomplished by a combination of Brazilian and foreign interests not only in the financing but in the technical management of the undertakings. In some instances where private capital is lacking or will not take the risk, the Federal Government is advancing capital for mine developments.

EDITOR'S NOTE

At the request of the Brazilian Department of Mines, the Board of Economic Welfare early this year sent R. J. Fleming, a coal mining geologist, and two coal mining engineers, also Mr. Thomas Fraser, engineer economist of the Bituminous Coal Division of the Interior Department, to study the situation in Brazil. This group, together with the engineers of the Brazilian Department of Mines and the mining companies, have worked out plans for the development of Brazil's coal fields and improvements in mining and preparation of the coal which are now being introduced.

A Technical Industrial Commission recently left for Rio to study still further the needs for expanding the coal industry as the present lack of coal supplies is becoming serious.

COAL IN BRAZIL*

THE COMBINATION of a generally mild climate, a plentiful wood supply, and numerous well-distributed water-power potentials, enabled Brazil to get along with little or no coal during its early period of development; but recent rapidly accelerated industrialization of that country is increasing the demand for coal. This is particularly necessary for certain centers of population that do not have adequate nearby hydro-power sources, and for the national railways system which has a rapidly growing traffic but still a far too thinly dispersed traffic to justify the capital expenditures that would be required for electrification. During recent prewar years, Brazil has required some two and a half to three million tons of coal per year, of which approximately half was imported for the most part from the British Isles and Germany. The other half was obtained from Brazilian mines in the southern states of Rio Grande do Sul, Santa Catarina, and Parana, with a few hundred tons each year from Sao Paulo.

Of Brazil's present production of about a million and a half tons per year of which about a million tons comes from the Cadem mines at Arroio dos Ratos and Butia. A small tonnage comes from other scattered operations in Rio Grande do Sul including that from state mines under development at Rio Negro near Bagé. Operations in the state of Santa Catarina are producing altogether at the rate of perhaps a quarter of a million tons a year and small tonnages are coming from Parana and Sao Paulo.

The railroads, of which the Central do Brasil is the largest fuel user, take slightly over half of the entire coal consumption, and the remainder is distributed more-or-less equally between the utilities and miscellaneous manufacturing and shipping industries.

The accompanying map shows the general location of the important coal consuming regions, as well as the potential coal producing areas and the connecting transportation facilities. An analysis of these relationships is essential to an understanding of the problems of the coal industry of Brazil.

The coal measures are of lower Permian age in the series known locally as the Tubarao. The deposits are, for the most part, rather small separated basins lying in a narrow zone extending from near Cerquilho in eastern Sao Paulo in a generally southwesterly direction to the vicinity of Bagé on the Uruguayan border. The coal itself is in general, low in heat units and high in ash and moisture content.

The Rio Grande do Sul Coal Fields

The thickest coal beds are those in the southernmost part of this coal basin in the state of Rio Grande do

Exposure of Barro Branco coal bed at Lauro Muller

* By Thomas Fraser, Engineer Economist, Bituminous Coal Division, Interior Department.

Sul. Here there are beds of coal as much as 8 ft. thick in their central areas, but a large part of the bed is made up of shale and slate binders so that the net thickness of the coal seams is 2 to 4 ft. The coal is a non-coking bituminous coal of hard structure with low caloric content and high in moisture.

At the present time a very large part of Brazil's coal production comes from two modern operations of the Consorcio Administrador de Empresas de Mineracao (CADEM) located at Arroio dos Ratos and Butia, some 25 miles west of Porto Alegre in the state of Rio Grande do Sul.

The Sao Jeronymo Mine is operating in a spoon-shaped basin some 1½ by 3½ miles in extent. It is opened by some five shafts and slopes but the principal output is now coming from Poco No. 5, which is a slope about 1,200 ft. long on 18 degrees inclination.

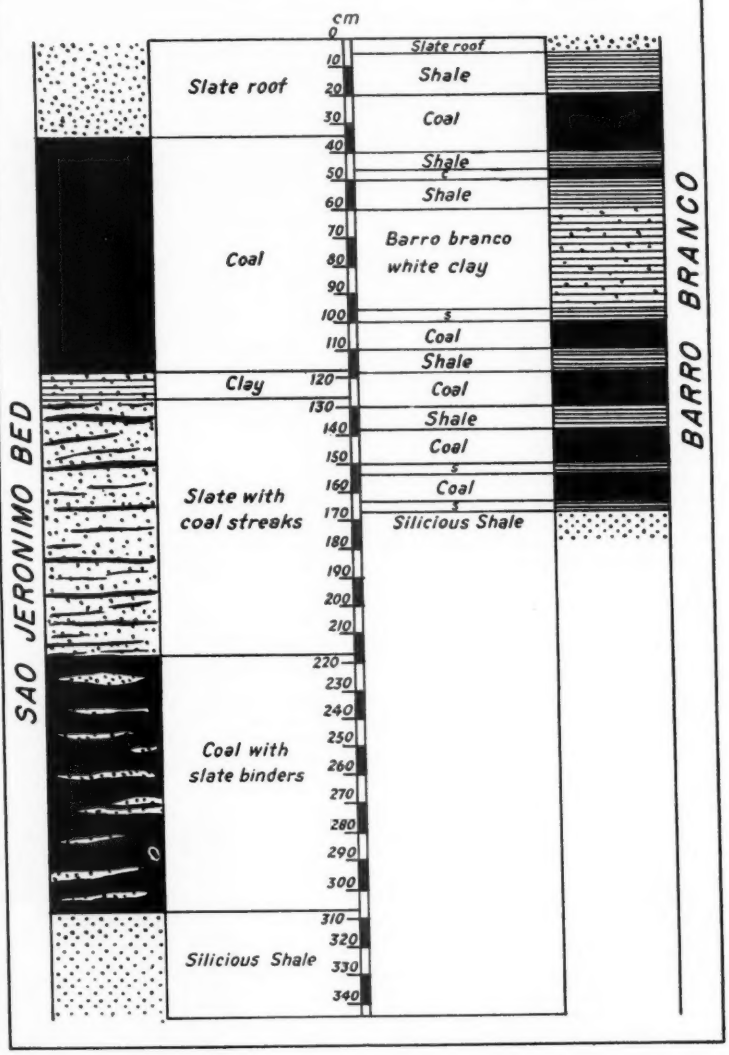
The seam in the central part of the basin is from 5 to 8 ft. thick, carrying about 4 ft. of coal, with a good slate roof and clay bottom.

The workings are laid out on the conventional room and pillar plan; the coal is mined by hand, shot with black powder, hand-loaded into cars, and hauled to the slope bottom by electric locomotives. The coal is brought out of the mine on an inclined belt conveyor that delivers it into the feed hopper of a modern McNally-Norton Baum Jig Washery with 100 tons hourly capacity. The lump coal over 1½ in. in size ordinarily is hand picked, and under 1½ in. is washed in the multiple-compartment air-operated jig. Performance of the washery is checked at hourly intervals by the float-and-sink method.

At Butia Mine of the Companhia Carbonifera e Minas de Butia, also a CADEM operation, the working conditions are similar; but, due to unevenness of the bottom, an extensive system of rope haulage ways is used for underground transport. A second McNally-Norton Washery is under construction at Butia; but at present the coal is hand picked.

Of the coal produced at the Cadem properties, a substantial portion is now delivered to the railways for local use and for delivery to the Central do Brasil; but the bulk of the output is barged down the Jacuhy River to Porto Alegre. Utilities companies associated with the Electric Bond and Share Company take upwards of 100,000 tons a year for use in thermal power plants and gas generators at Porto Alegre and Pelotas, and large tonnages are transferred at Porto Alegre and Rio Grande to ocean-going boats for coast-wise shipment to centers of population as far north as the metropolitan area of Rio de Janeiro. Before the development of the acute wartime shortage of coal in Brazil, some of this coal went to foreign buyers in Buenos Aires and Montevideo.

Section of San Jeronimo and Barro Branco Coal Beds



The Santa Catarina Coal Fields

In the State of Santa Catarina to the north, the coal is of better quality but the coal seams are thinner. The most important is the Barro Branco seam which is fairly persistent over an area some 15 by 30 miles. The main bed is some 3 to 5 ft. in thickness, but here also the coal is profusely interlaminated with shale bands leaving usually less than 3 ft. of merchantable coal. The coal is of medium volatile bituminous type with strong coking properties.

This section of Santa Catarina is somewhat mountainous and the topographic features are generally similar to those of our Appalachian coal fields. The bed out-crops and, at most operations, it is opened by drifts. Relatively small areas of room and pillar workings are developed from such opening. The two benches of coal are removed separately by hand mining methods and the coal is generally trammed to the outside by hand. Transportation from individual operations to preparation plants and rail loading points is by aerial tram, truck, or wagon. Some small stripping operations are being developed and it is tentatively estimated that there is a

substantial area of coal suitable for that mining method.

In Santa Catarina, there are several mining operations in the territory served by the Dona Theresa Christina Railway. All these are working the Barro Branco (white clay) seam. This seam is characterized throughout the territory by the white clay band varying from 8 to 18 in. thick near the middle of the bed. Above the clay band, there is a dirty band of about the same thickness, consisting of interlaminated schist and coal. Both of these bands are discarded in present mining practice. The coal is divided about equally between the top and bottom benches, and aggregates 2½ ft. out of a total seam thickness of 3½ ft. in the northern part of the field at Lauro Muller, and about 3 ft. out of a total bed thickness of up to 5 ft. in the southern part of the field around Creciuma.

The oldest and largest single producer in the Santa Catarina field is the Companhia Nacional Barro Branco with several mine openings and a central preparation plant near Lauro Muller. However, there are a number of independent smaller producers working in the Barro Branco coal around Creciuma that, in the aggregate, ship more coal out of the Creciuma yards.

The largest preparation plant in the Santa Catarina field is at the Lauro Muller property of Cia Nacional Barro Branco. This plant is equipped with two Elmore jigs of American design and two Deister-Overstrom diagonal deck tables.

Other small plants in the field include two rather well operated Deister-Overstrom plants; a four-compartment jig washery (of German manufacture) with a feldspar bed in the fine coal compartment for handling ⅛ by 0 in. coal; a commercial hand jig washery in which three workmen deliver seven tons of coal per day of finished washed coal of very good grade; and several picking shed plants where the coal is laboriously hand sorted.

McNally-Norton washery at the Butia Mine. This plant was built by McNally-Pittsburg Mfg. Corp., Kansas

These plants are capable of turning out small quantities of coal as low as 17 per cent in ash content. Small commercial operations at Creciuma have indicated that the product is suitable for the manufacture of metallurgical coke. The coal is peculiarly amendable to sulphur reduction. The raw coal commonly carries 7 per cent to 9 per cent and is reduced to 1 per cent in the washed product. However, irregularly operated washing plants of this kind are ordinarily erratic in performance. To obtain a substantially increased volume of uniformly prepared coal from this territory, it will be necessary to modernize preparation as well as mining practice.

In Santa Catarina the entire output, except small local supplies, moves over the lines of the Dona Theresa Christina Railroad to tidewater piers at Imbituba and Laguna. At Imbituba there is a newly constructed mechanically equipped loading bunker installation capable of handling coal at the rate of 500 tons per hour, and a modern pier is under construction at Laguna. From these ports the coal moves in the coastwise trade to Santos and Rio and to some extent beyond.

Washery at Lauro Muller Companlaia Nacional Barro Branco

The Parana Coal Field

The deposits of the northern part of Parana are probably of the best grade to be found in Brazil. Although only meager development work has been done in these fields, beds exposed along the Rio do Peixe and the Rio das Cinzas are reported to be free of interbedded impurities, but these beds are only 12 to 30 in. in thickness. The coal is reported to be the best in Brazil, particularly as to quality, but operations to date have been intermittent and the output small. The tidewater port of the Parana field is Paranagua but transportation to the port is difficult and the trade at present is insignificant in volume.

Conclusion

It will be apparent from this meager outline of the principal factors in the Brazil industry that the distribution pattern is very simple but it involves a variety of carrier methods, and the centers of production and consumption are rather widely separated. Transportation facilities and costs are therefore very important factors in the situation.

High ash content of the coal is the most adverse physical factor. It can be substantially improved by washing; but, at best, the resulting product will be of rather poor grade. Most effective utilization of these coals will require a coordinated program of production and utilization developments approaching the problem from the production end by use of the best possible preparation technique, and from the use end by the adaptation of combustion equipment and methods specially suited to the high ash fuel.

Treated Timber For Mine Roof Support

An Examination After Ten Years of Service Shows Timbers Still in Excellent Condition

IN 1931 a coal mining company in central Pennsylvania began the use of pressure treated timber for underground roof support and in the following two years completed an extensive timbering program in several of their long life entries. A part of the installation was made in a water-way 8,500 ft. long in which 1,400 three-piece treated timber sets were placed on 5 ft. centers; each set consisting of 8 in. x 10 in. cross bars on 8 in. x 8 in. legs. The drainage ditch is along one rib, so that one leg of the set is in the water; this entry is also used as a return air-way and as the ventilating current carries spores from decaying timbers, the combination of the air and moisture condition have been ideal for fungus growth. It was estimated that the average life of untreated timber in this location was from two to three years and before the treated timbers were installed, the untreated sets of unseasoned oak were being replaced at a rate of about 50 a month.

Beginning in 1931, and continuing until the entry was entirely retimbered in 1933, the replacements were made with sawed yellow pine, treated either with zinc-meta-arsenate, zinc chloride, Wolman salts or creosote. All of the preservative was applied under the standard pressure process treatment specifications of the American Wood Preservers Association.

Economy of Treated Timber

After the installation had been in use for six years, an account was published in the October, 1938, MINING CONGRESS JOURNAL giving the results to that date. Recently, in June, 1942, a check-up examination of the timbers was made by several of the coal company officials and the results of this examination are submitted with this article. Complete details are given, including the method of preservative treatment and it will be noted that after ten years of service, the sets are still in excellent condition with apparently a long life ahead.

The use of the treated timber has undoubtedly proved very economical. In 1938, after six years of life, it was estimated that there had been a saving of $5.40 per three-piece set; based on a life of three years for untreated timber. The estimate today on this same basis would show that over a ten-year period this saving has more than doubled and now amounts to approximately $12 per set or at least $15,000 in the 8,500-ft. entry. The increased cost of labor and material that have occurred since the original installation was made, would probably add further to the dollars really saved.

Conservation of Steel

The result of the inspection indicates that pressure treated timbers can be classed as satisfactory roof supports for long life mine entries. This conclusion is of particular value at this time in our history when steel is difficult to obtain and substitute materials must be used wherever possible. In considering a comparison between the relative strengths and sizes of wood and steel for cross bars, it will be of interest to refer to the report of the Roof Committee which was published in the August, 1941, MINING CONGRESS JOURNAL.

Table 2-B of this report shows that an 8 x 10 timber and a 100 pound rail have equivalent supporting strengths for a 10 ft. span and if this size rail had been used in the 1400 ft. entry covered by the inspection, there would have been 200 tons of steel required. This size, of course, would not be economical unless it were waste or salvage material, but structural steel beams would have weighed approximately 15 pounds per ft. or a total of about 90 tons for the entry.

Report of Inspection

Sets number 1 *to* 75 *inclusive.*

These framed 3-piece sets were treated with ZMA to ¼ lb. per cu. ft. retention and installed during October and November, 1931. Of the 75 sets, 47 remained, removal of the balance was due to failure under heavy roof pressure. Remaining sets were in good condition, free of rot.

Sets numbered 76 *to* 150 *inclusive.*

These framed 3-piece sets were treated with creosote to 12 lb. reten-

Showing creosoted set and fungi on untreated cribbing above. Note one leg in running water

tion and installed during November and December, 1931. Of the 75 sets, 69 remained, removal of the balance was due to failure under heavy roof pressure. Remaining sets were in good condition, free of rot.

Sets numbered 151 *to* 225 *inclusive.*

These framed 3-piece sets were treated with Zinc Chloride to 1 lb. retention and installed during December, 1931, and January, 1932. Of the 75 sets, 70 remained, removal of the balance was due to failure under heavy roof pressure. Remaining sets were in good condition, free of rot. Ten sets still in place had cross-bars broken due to roof pressure.

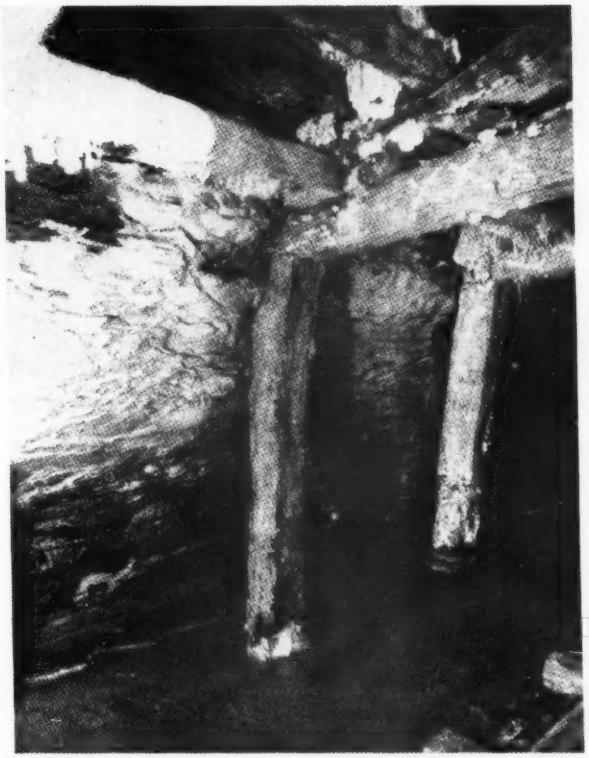
Sets numbered 227 *to* 272 *inclusive.*

These unframed 3-piece sets had the cross-bar and leg on the high side treated with Wolman salts to 1/3 lb. per cu. ft. retention and the leg in the ditch with Creosote to 8 lb. retention. These sets were installed during the early part of 1935. None of these 46 sets have been removed all are in good condition, free of rot.

Sets 273 *to* 1,298.

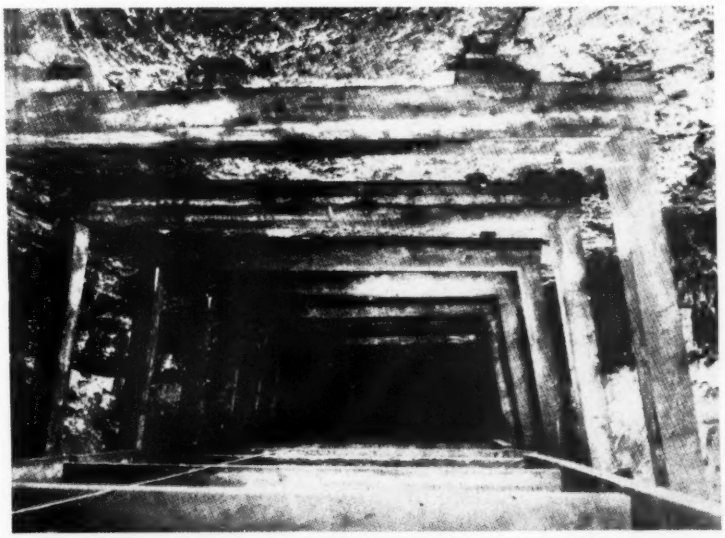
In addition to the above numbered sets, 1,025 other 3-piece sets of ZMA treated timber were installed in the drainage course in 1932 and 1933 to complete the retimbering. Each set consisted of an 8-in. x 10-in. cross-bar on 8-in. x 8-in. legs. All of this timber was examined, in connection with the current inspection of the numbered sets. All except one set was found to be in an excellent state of preservation, free of rot. Some surface mold was present but same is not of a deleterious nature. The breaks in cross-bars referred to in connection with the Zinc Chloride treated timber showed the wood to be sound and unrotted.

One cross-bar, the exception referred to above, probably treated with ZMA, showed decay in a patch about 10 in. long, 6 in. wide and about 2 in. deep. This was the only rot observed in the course of this inspection.



Showing the decay which occurred when untreated timber was used

Considerable amounts of untreated timber are still in place in this drainage course, being used mostly for lagging and pony sets on top of the main sets. The mine foreman and timber boss at this mine believe the useful life of this untreated timber is only about two years. Subsequent to the initial installation of this treated timber, the question was raised as to whether or not the leg in the ditch through which water is continually flowing, might not have the protective salts leached out by the running water. This inspection indicated that no rot had yet occurred near the zone of alternately wet and dry wood where such trouble could be looked for.



Pony sits on top of 3-pieces sets. Note framing, cross braces and alignment

Wheels of Government

As Viewed by A. W. Dickinson of the American Mining Congress

THE GROWING PAINS of the expanded war effort have been much in evidence in recent weeks, and will continue for several months to come. With the passage of the Stabilization Bill, Congress has granted to the President the powers over wages and prices which he requested, and upon the return of the Chief Executive from his swing around the country inspecting war plants and war preparation, Associate Supreme Court Justice Jim Byrnes of South Carolina has been appointed czar over the stabilization procedure.

Meanwhile Donald Nelson has further reorganized and strengthened his War Production Board administration for the allotment of available materials to war and civilian needs, the War Manpower Commission is rapidly moving toward assignment of the nation's manpower in the emergency, representatives of organized labor are lining up for a full production effort without strikes, and the Senate Finance Committee is pushing the Revenue Bill of 1942 toward enactment on a basis adjusted to the wartime demands.

Tax Mills Are Grinding

On Friday, October 2, after 73 days of consideration the Senate Committee on Finance reported the Revenue Bill of 1942. In the 577-page measure the corporation normal and surtax rates stand at 40 percent with an excess profits tax rate of 90 percent and an overall tax limitation of 80 percent. The percentage depletion provision remains as in the House bill including the Disney amendment allowing an annual election either for percentage depletion or depletion on the basis of cost or March 1, 1913, value. Gone from the bill is the House-proposed 5 percent excise tax on freight and express. Included is the Treasury version of the unit-of-production credit which reduces the credit progressively in accordance with a table of percentages determined by the ratio of the mine's reserves to its increase in production. A further supplement to the Johnson amendment gives to coal and iron mines a credit against excess profits net income equal to one-half the product of the unit net income from the property, times the number of units produced in the taxable year in excess of average annual base period production.

The strategic minerals exemption from excess profits tax is restored, retroactive to 1941, and now includes antimony, chromite, manganese, nickel, platinum, quicksilver, sheet mica, tantalum, tin, tungsten and vanadium. Also in the bill is a special four-year carry-forward of losses on mining operations for 1938 and three-year carry-forward of 1939 losses. Copper, lead and zinc bonus payments for over-quota production are exempt from excess profits tax including bonuses received by fiscal year corporations; as reported, however, the bill limits this exemption to the net income attributable to the over-quota production.

The flat excess profits exemption remains at $5,000 as in House bill. Capital stock tax and declared value excess profits tax are removed. Simplified procedure is adopted for collection at source of a 5 percent "Victory Tax," and a parallel 5 percent withholding tax on dividends, interest, rents, royalties, etc., is provided. By the Vandenberg amendment social security taxes are frozen at 1 percent on employers and employes for 1943.

Corporations are permitted to compute lowest base-period year earning as equivalent to 75 percent of the average of the other three years for excess profits tax purposes. General relief provisions under excess profits tax are made retroactive to 1941 and 1940. Earnings of fiscal year corporations up to June 30, 1942, would be taxable at the 1941 rates and subsequent earnings at the 1942 rates. Also approved is a two-year carry-back of losses and unused excess profits tax credit, supplementing the existing two-year carry-forward.

The American Mining Congress Tax Committee is continuing negotiations with the Treasury for the purpose of arriving at a specific understanding of the meaning of the term "gross income from the property," for purposes of computing the percentage depletion allowance for mines generally and the excess profits tax exemption for strategic minerals, and of restor-

Washington Highlights

INFLATION: Wages and prices frozen.

MANPOWER: Assignment of jobs looms.

REVENUE BILL: 577-page law to give Uncle Sam eight billion dollars.

COAL AND IRON: Special provision in Johnson amendment.

STRATEGIC MINERALS: Exempt from excess profits tax.

COPPER-LEAD-ZINC: Over-quota payments exempt from excess profits tax.

SOCIAL SECURITY TAX: Remains unchanged for 1943.

METAL MINE WORKERS: "You're important—stay put," say Hershey and McNutt.

BACK TO THE MINE: 4,000 soldiers may be furloughed for former jobs.

HIGHER COAL PRICES: Bituminous gets slight boost.

ICKES' COAL CONFERENCE: Discusses longer workweek.

GOLD MINES: WMC wants their miners.

ing the interpretations and practices in effect until recently.

A Finance Subcommittee has been considering revision of the existing war contracts renegotiation law and has heard Undersecretary of War Patterson suggest that contracts totaling less than $250,000 in fiscal year be exempted from renegotiation. Judge Patterson also stated that the term "subcontract" should exclude agreements for raw materials or standard commercial fabricated or semi-fabricated articles for the reason that excess profits on these items can preferably be handled through the excess profits levy and because their inclusion under renegotiation tends to make the burden of renegotiation almost impossible.

Finance Committee Chairman George is making every effort to send the Revenue Bill to the President as early as possible in October.

Increase Social Security Levy

Senator Vandenberg of Michigan, as a member of the Finance Committee, was able to place a provision in the Revenue Bill freezing social security taxes on employers and employes at 1 percent for 1943. He did so with a full realization of the efforts which are being made not only to increase social security taxes but also to extend the benefits of old age insurance to domestic servants, agricultural workers and to persons who are self-employed. A bill recently introduced by Representative Eliot of Massachusetts would provide this additional coverage and would federalize the present system of unemployment insurance and increase the benefits therefrom. Under Representative Eliot's bill payroll taxes against employers (as now covered in the Act) would be a total of 5 percent for 1943, 1944 and 1945 increasing to 5½ percent in 1946, 1947 and 1948 thereafter increasing to 6 percent; employers would pay at the same rates. This would merge payments for unemployment insurance and old age insurance and equalize employe payments with those of employers. Employers of agricultural labor and domestic servants would pay 2 percent in 1943, 1944 and 1945; 2½ percent in 1946, 1947 and 1948 and 3 percent thereafter with employes paying at the same rate. Self-employed persons would pay 4 percent, 5 percent and 6 percent in the same range of years.

"Certificates of Separation"

In a plan made effective September 7 the War Manpower Commission established a "critical area" in the states of Arizona, Colorado, Idaho, Montana, Utah, Wyoming, California, Nevada, Oregon, Washington, New Mexico and Texas. In this area after September 7 the plan provides that no employer is permitted to hire any worker leaving employment in any production or maintenance occupation in non-ferrous metal mining, milling, smelting or refining, or in logging or lumbering, except upon presentation of a "certificate of separation." Such certificates are to be obtained by the workmen from the U. S. Employment Service, and controversies arising may be appealed successively to the Area War Manpower Committee, Regional War Manpower Committee, and the National Management-Labor Policy Committee.

In further support of the plan Selective Service System Director Hershey ordered State Directors to reclassify as immediately available for military service any worker who leaves his job in copper or other non-ferrous metal operations or in the lumber industry.

A further statement from WMC Chairman McNutt specifies that the certificate of separation plan includes all mines producing ores from which the following metals are produced, as well as all milling, smelting, and refining operations in connection with their production: aluminum (including alunite and bauxite ores); antimony, arsenic, beryllium, chrome, cobalt, columbium, copper, lead, magnesium, manganese, mercury, molybdenum, tantalum, tin, titanium, tungsten, uranium, vanadium, zinc and zirconium.

In mid-September the War Labor Board mediation panel recommended a wage increase of $1 per day for copper, lead and zinc miners in Idaho and Utah together with varying paying increases to smelter and refinery employes. The recommendation was followed by a public hearing on September 24 at which representatives of mine management and workmen presented further arguments and Army, Navy and Maritime Commission officials stressed the serious shortage of copper, lead and zinc. War Production Board and War Manpower Commission officials endorsed the panel's recommendation for wage increases as necessary to "keep workers and attract workers." No representative appeared from the Office of Price Administration which long ago fixed ceiling prices on copper, lead, and zinc.

The U. S. Employment Service has grudgingly certified Mexican agricultural workers for temporary admission, but with thousands of able Mexican miners available in Mexico none have as yet been admitted to relieve the shortage of men so badly needed for the production of non-ferrous and strategic metals and minerals.

Selective Service Action

Both the Army and the Navy have announced that civilians occupying key positions in the mining and treatment of coal, metal and non-metallic minerals, and in the production of mining machinery will not be accepted for commission or enlistment without first obtaining a written release from the head of the agency or war industry concerned. This means executives, heads of major divisions of departments and principal subdivisions, and technical experts whose principal duties involve design, planning or research in the industries named. While occupational bulletins have previously issued to local draft boards naming "critical employes" this statement of policy by the Army and Navy is the first announcement in which executives, supervisory and technical employes have been given broad recognition as essential to war production.

Action by the Army is also pending to furlough 4,000 copper, lead and zinc miners to relieve the labor shortage in non-ferrous metal mining. Further indication that the War Department is seriously entering into the manpower situation is given with the assignment of 31 additional officers to represent the Army in matters of labor supply affecting war production. These officers are serving in the Civilian Personnel Division of the Manpower Branch and many mining areas are included in the territory in which they will serve.

More Coal Tonnage

Nationwide increases averaging 15.53¢ per ton in the price of bituminous coal at the mines were put in effect on October 1 by the Bituminous Coal Division. This moderate rise coupled with stockpile increases to 85,000,000 tons and a tightening up on "no-bill" coal car practices indicates the push that is on for production. The Selective Service System has also struck directly at absenteeism by

(*Continued on page* 64)

GOLD MINES ORDERED CLOSED

As we go to press the WPB has issued a shutdown order prohibiting the breaking of new ore after October 15 in gold mines which do not hold a serial number under Order P-56. Following the lapse of 60 days after October 8 neither lode nor placer, including dredging operations, may use any material or labor other than for maintenance of buildings, machinery, and equipment and to keep access and development workings safe and accessible. Mines producing less than 100 tons of ore per month are exempted. Appeal may be taken to the Director General for Operations, WPB, in case of exceptional and unreasonable hardship.

PERSONALS

Jesse Redyard has been appointed chief of the West Virginia Department of Mines, effective September 1, succeeding N. P. Rhinehart who held the position for the past nine years. Mr. Redyard, who has been engaged in the coal business for himself in Wyoming County, W. Va., for the past two and one-half years, was formerly safety director for the Koppers Coal Company at their Kopperston operations, and previously has served as

Jesse Redyard

safety director of the New River and Pocahontas Consolidated Coal Company for nine years. He is well known throughout the coal mining industry having served as chief inspector of the Arkansas Department of Mines for six years following his return from France in 1919, and later was engaged in accident prevention and safety work for the Bureau of Mines in the Eastern and Central states.

John F. McMahon, formerly executive secretary, has been elected managing director of Industrial Hygiene Foundation. Mr. McMahon succeeds **Dr. H. B. Meller** who is resigning because of ill health.

Alvaro Abreu of the Brazilian Department of Mines is expected to arrive soon in the United States to study American methods of preparing and using coal. Mr. Abreu is a graduate of the National School of Mines at Ouro Preto and is a specialist in ore dressing. He was assigned by the Brazilian Government to work with Mr. Thomas Fraser during the latter's study of preparation problems in Brazil and will continue such work in Brazil coals. He is particularly interested in the preparation of high ash, bony coals and in special combustion devices for such coals.

Gabriel Oliveira, of the Brazilian Department of Mines, is now in the United States studying our mining methods with a view to adopting modern American practice to the Brazilian coal mining industry. Mr. Oliveira is particularly interested in the mechanical mining of thin seams under difficult conditions. Mr. Oliveira is a graduate of the National School of Mines of Oro Preto.

Thomas Matchett, president of Robins Conveying Belt Co., Passaic, N. J., has been appointed to the Conveyor and Mechanical Power Transmission Industry Advisory Committee of the War Production Board. The company also announces that the implementing of measures to meet war production demands has resulted in the election of three additional vice presidents: **R. W. Eichenberger** and **E. C. Salzman**, of the home office, and **J. F. Meissner** who remains as manager of the Chicago office. **Harold VonThaden** continues to be first vice president.

E. R. Cullity, manager, Mining Division, Southwestern Engineering Co., Los Angeles, Calif., recently completed a business trip to Washington and New York.

Oscar H. Johnson, formerly vice president of The Mine and Smelter Supply Company, has been elected president, succeeding **Albert E. Seep**, now in the armed forces of the United States. **Herman F. Seep** is vice president and **H. J. Gundlach**, general purchasing agent, has been made a director. **J. D. Nicholson** was recently made general manager.

Herbert C. Enos, consulting mining engineer, has returned to Chatsworth, Calif., having completed an assignment for the Minerals Division of the Board of Economic Warfare in Brazil.

The appointment of **Dr. Joseph B. Umpleby**, of Seattle, Wash., well-known geologist, as assistant coordinator of solid fuels to have charge of the problems in that field arising in the Pacific Coast area, was announced today by Solid Fuels Coordinator for War Harold L. Ickes.

Dr. Umpleby's work, Coordinator Ickes said, will be carried out particularly in the States of Washington and Oregon, where expanded war production, shortage of labor and transportation dislocations have resulted in special problems in solid fuels supply.

The new assistant coordinator has been actively engaged in geological studies since 1906 and served on the staff of the United States Geological Survey from 1908 to 1919. Although retiring from full-time service in 1936, he has continued as a consulting geologist.

At a recent meeting of the Board of Directors of the Mining Association of the Southwest three new directors were elected to serve during the remainder of the year. They are **Oscar Mills** of Nevada Scheelite, and **W. W. Hartman** of the Wall Street Mine, representing the Tungsten Division, and **Fred Koehler** of Arizona Manganese Corp., who worked out the Artillery Peak manganese proposition in Arizona for the M. A. Hanna Co. Mr. Koehler represents the Manganese Division.

A. C. Dittrick has become affiliated with the Warner Collieries Co., St. Clairsville, Ohio, as assistant general manager of mines.

J. H. Edwards, associate editor of *Coal Age*, has been reappointed to the Committee on Industrial Power Applications of the American Institute of Electrical Engineers.

George E. Stringfellow, vice president, Thomas A. Edison, Inc., has announced the appointment of **E. P. Cramer** as advertising manager of the Edison Storage Battery Division of

E. P. Cramer

the company, effective immediately. Mr. Cramer has been with the advertising department of the Division for ten years as field editor of Storage Battery Power, a house publication.

W. Capen Shank, of Johnson County, Kansas, has been appointed regional director of WPB, with headquarters in Kansas City, Mo. Region No. 7, centering in Kansas City, comprises the States of Arkansas, Kansas, Missouri and Nebraska. Mr. Shank is president of the Crowe Coal Mining Company, Kansas City, Mo.

Secretary of the Interior Harold L. Ickes today announced that **Howard A. Gray**, formerly Acting Director of the Office of Solid Fuels Coordinator for War, has been made Deputy Solid Fuels Coordinator for War. He also announced that **Dan H. Wheeler**, for-

Howard A. Gray

merly Acting Director of the Bituminous Coal Division, has been made the Director of that Division. Secretary Ickes is the Solid Fuels Coordinator.

Prior to being appointed as Acting Director in the Office of Solid Fuels Coordination, Mr. Gray was Director of the Bituminous Coal Division. Mr. Wheeler was Assistant Director of that agency.

I. S. Gillespie, formerly associated with the Woodward Iron Co., Woodward, Ala., has been made resident engineer for the Cane Creek Mining Co. and affiliated companies, Bankhead, Ala.

Robert D. Butler, assistant professor of economic geology and mineralogy at Lehigh University recently joined the staff of the metals and minerals division of the Board of Economic Warfare, Washington, D. C.

Joseph A. Kelley has been assigned a post in the fuel inspection section of the U. S. Bureau of Mines in Washington.

Frank M. Stephens, Jr., has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to the materials beneficiation division. Mr. Stephens is a recent graduate of the Colorado School of Mines and a member of the American Institute of Mining and Metallurgical Engineers.

J. F. Wiggert, chief electrical engineer, Homestake Mining Co., Lead, S. Dak., has retired. He entered the employ of the Homestake Mining Co. electrical department, April 1, 1902. **Cedric L. Gust**, assistant chief electrical engineer since 1923, has been appointed chief electrical engineer. **Harold Edward Ross** becomes assistant chief electrical engineer.

Professor **Richard Herb Reece** has been appointed president of the New Mexico School of Mines at Socorro and director of the State Bureau of Mines and Mineral Resources. He has been professor of mathematics and physics at Socorro since 1917. For eight years he was dean of men and was administrative assistant to former president **Dr. C. E. Needham** who resigned this year.

Homer D. Erwin has joined the staff of the American Smelting & Refining Co., Sonora, Mexico, as scouting engineer and geologist.

Dr. W. H. Twenhofel, Professor of Geology at the University of Wisconsin and authority on sedimentation, has been employed by the Oregon Department of Geology and Mineral Industries to make a study of marine sand deposition in the ancient beach terraces of the southwestern Oregon coastal area. Particular attention will be given to occurrence of chromite sands in the terraces at high elevations concerning which little geologic information is available.

Lincoln Johnson, vice president in charge of the foreign department of Manufacturers Trust Co., New York, is serving as an advisor to the Metals Reserve Co., in Washington, D. C. Mr. Johnson is a mining engineer, with extensive mining experience before entering the banking field.

C. M. Baker, formerly mining engineer with Republic Steel, Port Henry, N. Y., has joined the engineering staff of the Tennessee Coal, Iron & Railroad Co. at Mussoda, Ala.

George R. Drysdale, secretary and comptroller of the Phelps Dodge Corporation, New York, has been elected a vice president of the Controllers Institute of America, a technical and professional organization of controllers devoted to improvement of controllership procedure.

William K. Lambie, formerly general manager for the Gigliardi coal interests, has been appointed superintendent of the Somers mine of the Pittsburgh Coal Co., Pricedale, Pa.

Clarence L. Payne, cutting-machine operator, has been promoted to Joy foreman at Zeigler No. 2 mine, Bell & Zoller Coal & Mining Co., Zeigler, Ill.

The many friends of **Arthur S. Knoizen**, vice president, Joy Manufacturing Company, will be glad to know he is again on the job at Franklin, after an illness in a Pittsburgh hospital.

George Lindsay, of Eldorado, Ill., has become associated with B. E. Schonthal & Co., Inc., handling the sale of The Johnson-March products.

Word has just reached **John C. Cosgrove**, consulting engineer, Johnstown, Pa., that his son, **John, Jr.**, has been promoted to Second Lieutenant, South African Engineers in the British Army. John, Jr., better known to his friends as Jack, was a mining engineer in the gold fields of South Africa when he enlisted in the army two and one-half years ago. Since that time he has seen service in Egypt, Libya, Syria, Central and South Africa.

George Jay, western traffic agent for the Phelps Dodge Corporation, has retired after 29 years of service with the company, due to ill health, and is succeeded by A. C. Bacon, formerly assistant.

N. P. Rhinehart, lately with the West Virginia Department of Mines, Charleston, is reported to have joined

N. P. Rhinehart

E. G. Bailey and Kenna Gentry in a stripping operation near Wellsburg, West Virginia, in the northern panhandle.

Fred J. Bailey, general safety inspector, Koppers Coal Company, has joined the United States Bureau of Mines, Pittsburgh, Pa., Mineral Production Security Division. He has been associated with Koppers Coal Company 14 years, seven as foreman and seven as safety inspector.

John A. Luse, of New York, assistant to the president of the Carter Coal Co., Coalwood, recently visited the company's operations in the Pocahontas fields.

J. L. Dollar, formerly mine superintendent at the Montevallo mine of the Montevallo Coal Mining Co., Aldrich, Ala., has been appointed mine foreman at Bankhead No. 1 mine of the Cane Creek Mining Co., Bankhead, Ala. The Montevallo mine has been closed.

Robert J. Blair, formerly resident engineer with the Cane Creek Mining Co., Bankhead, Ala., and affiliated interests, has been named assistant to the general superintendent of mines of the DeBardeleben Coal Corporation, Sipsey, Ala.

Donald F. Campbell has left the University of Arizona, where he had a teaching fellowship in geology, to become associate engineer with the Reconstruction Finance Corporation in Phoenix.

Sam S. Coldren has completed a six months' contract with the U. S. Army engineers in Panama and is now working with **Henry Altshuler** in the development and mining of tin and tungsten properties near La Paz, Bolivia.

H. R. Wheeler, sales department, Joy Manufacturing Co., has been given a temporary leave of absence to accept an assignment in England assisting the British Government in a coal mining mechanization program.

J. W. Garvey, formerly general manager of operations, Maryland New River Coal Co., has been appointed vice president in charge of operations. He will continue to have headquarters at Winona, W. Va.

Thomas H. Miller, mining engineer, metallurgist and an authority on metallic minerals, has been named chief of the Metals Economics Division of

Thomas H. Miller

the Bureau of Mines, Dr. R. R. Sayers, Director of the Bureau, announced recently. Formerly assistant chief of the Metals Economics Division, Mr. Miller has been with the Bureau of Mines since 1928. Extensive metallurgical research work, together with wide experience in compiling and interpreting statistical data on metals and the metal industries, have qualified him for the position to which he has been appointed.

Dr. Charles H. Fulton, until his retirement in 1937 as Director of the Missouri School of Mines, has been appointed head of the Metallurgical Department at the Montana School of Mines, taking the place of Professor J. P. Spielman, now in the U. S. Air Corps.

Charles F. Jackson, formerly with the U. S. Bureau of Mines, is now associated with the Thayer Lindsley Interests, and Panaminas, Inc., with headquarters at 230 Park Avenue, New York.

Raymond G. Denny, for many years superintendent of Mines 204, 206 and 207 of the Consolidation Coal Co., Jenkins, Ky., left Jenkins on August 4 to become general superintendent of the West Virginia Coal & Coke Corporation, Omar, W. Va.

C. C. Morfit was appointed a vice president of the Pennsylvania Coal & Coke Corporation on August 20. He will be in charge of operations with headquarters at Cresson, Pa.

J. M. Johnston, assistant general manager, has been named vice president in charge of operations of the Bell & Zoller Coal & Mining Co., Zeigler, Ill.

Otto Ruhl, widely-known Joplin mining man, has accepted a position as mining engineer with the United States Bureau of Mines, Rolla, Mo. He is engaged in general examination work under the supervision of **W. D. McMillan** of Rolla, Tri-State district engineer for the Bureau.

Rochester & Pittsburgh Coal Co. announces that **L. W. Householder**

L. W. Householder

has resigned as vice president, effective October 1, 1942, to accept the presidency of Whiteman & Co., Inc.

Martin D. Collier, with the Consolidation Coal Co. for a number of years, has been made superintendent of the company's Nos. 204 and 206 mines, Jenkins, Ky. Mr. Collier succeeds **Raymond C. Denny,** now general superintendent for the West Virginia Coal & Coke Co., Omar, W. Va.

—Obituaries—

Mark Winslow Potter, 76, president of the Pennsylvania Coal & Coke Corporation, noted corporation lawyer and former member of the Interstate Commerce Commission died August 12 of a heart attack in his office in New York City. He was appointed to the I. C. C. by President Wilson, serving from 1921 to 1925. Later he headed the Carolina, Clinchfield & Ohio Railway, the Clinchfield Coal Corporation, and the Cumberland Corporation.

John Henry Hand, 72, a mining engineer and geologist of Yellville, Ark., died in a Little Rock Hospital, August 20. Mr. Hand, familiary known as "Judge," had devoted practically all his time the past 25 years to the development of the North Arkansas zinc field and dams. Judge Hand was very active in the Southern Division work of the American Mining Congress, having served on the Board of Directors and for one year as chairman.

Charles D. Kaeding, well known mining engineer and geologist in the U. S. and Canada, died September 10 in a Toronto hospital at the age of 61. At various times Mr. Kaeding was president of Sachigo River Exploration Company, Onitgo Gold Mines, Metshico Limited, and the K. Engineering and Security Company; managing director of Pacific Nickel Mines and director of Steep Rock Iron Mines and Pioneer Gold Mines of British Columbia.

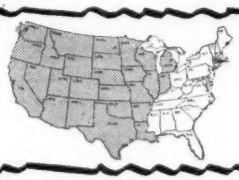
Widely known and beloved by his friends in the mining industry and the coal trade, **John A. Howe,** Executive Vice President and Director of the Truax-Traer Coal Company, passed away in Chicago on September 1. Born in Superior, Wis., he spent his early life with the Carnegie Dock and Fuel Company of Minnesota, rising to the presidency and thereafter joining the Truax-Traer organization in 1931. Recognized as an organizer and a man of energy and tact his activities in the last ten years brought to him national recognition and the sincere regard of all in the industry.

Harry T. Thompson, district manager of the Metal and Thermit Corporation, died at his home in Mt. Lebanon, Pa., on Wednesday, August 19, at the age of 53.

Arthur V. Card, vice president and treasurer of the C. S. Card Iron Works Company of Denver, Colo., died on September 5 as he was piloting his own plane when it crashed on a high Colorado mountain pass due to a severe down draft. For the past 22 years, Mr. Card had been associated with the company founded by his father, C. S. Card. Both in mining and manufacturing, Arthur Card had a wide circle of friends throughout the western United States, who deeply regret his passing.

News and Views

Eastern States



PENNSYLVANIA

Industrial Minerals to Be Discussed at A. I. M. E. Meeting

With supplies of critical minerals and ores from Africa and Asia curtailed because of the war, South America looms as an important source of supply. The members of the Industrial Minerals Division of the American Institute of Mining and Metallurgical Engineers will have an opportunity to hear this situation discussed at their dinner at the Hotel Bethlehem, Bethlehem, Pa., Friday evening, October 23, by Charles Will Wright, of the Board of Economic Warfare, who will speak on "South America as a Source of Strategic Minerals." An informal discussion led by J. T. Singewald, Jr., of Johns Hopkins University, and Paul M. Tyler, Board of Economic Warfare, will follow. The dinner will be the feature of the Division's fall meeting, Thursday through Saturday, October 22-24.

President Williams of Lehigh University will deliver the address of welcome at the first technical session on Thursday afternoon. The second session will follow an informal dinner Thursday evening and the third will be held Saturday morning. All the sessions will be at the Hotel Bethlehem.

»»» It is reported that a river coordinator will be appointed soon for the Pittsburgh, Pa., area to improve utilization of the coal barges serving the area.

»»» The Glen Alden Coal Co., Scranton, Pa., has leased its Storrs colliery to the Moffat Coal Co. for a period of 15 years from August 1. Earl W. Lamb, formerly with the Penn Anthracite Collieries Co., has been appointed general superintendent of the operation. The property suspended operations about 10 years ago, and is reported to have 30 to 40 million tons of unmined coal in its seams.

»»» The H. C. Frick Coke Co., subsidiary of U. S. Steel Corporation, is planning development to increase coal output in Greene County, according to a recent announcement by Harry M. Moses, president. A service shaft is now under construction near Sugar Grove Church in Monongahela Township.

WEST VIRGINIA

L. EBERSOLE GAINES, president, The New River Company, Mount Hope, W. Va., and president of West Virginia Coal Association, delivered an address at the monthly meeting of the New River & Winding Gulf Mining Institute, at Beckley, W. Va., on September 10.

L. Ebersole Gaines

Mr. Gaines prefaced his talk by complimenting the Institute in its efforts to better conditions and improve mining methods by higher education along technical lines. He said, "I am impressed more and more each day by the character and ability of the men in the coal business all the way from the men who plan and supervise down to the men who do the actual carrying out of orders. There is more intelligence in the coal business and mining industry than we have been given credit for. I am always very much impressed now when I see a group of coal men together discussing matters affecting their industry to see what a very outstanding group it almost always is."

The theme of his address dealt with the responsibilities of the coal mining industry and particularly what the miners of West Viriginia can do in the war effort. He said, "Now we are engaged in a global war which has continuous action in every continent in the world. The fate of all is at stake because our way of life and theory of government and system of economics is absolutely opposed by those we are fighting today. The leaders of those opposing forces have gone back into the middle ages to establish for themselves a system of government. It has no religion whatever and in fact nothing in any sense comparable to anything we are living under and which we have fought for and cherished up to this day."

"West Virginia's efforts in the furnishing of men for the war is, of course, of primary importance. There is no area in these United States which is more important, or which could not be done without, than this area in which we live. The chemical industry of this country is settled in West Virginia. We have plants in our state which are contributors of implements of war. The steel industry of our state is doing its part.

"It is our lot to be connected with the coal industry. In 1918 we produced 90,000,000 tons of coal in West Virginia for the war effort. This year, 1942, we will produce around 150,000,000 tons of coal for the war effort. Coal is the largest single 'crop' we have in West Virginia. Two out of three people in the state of West Virginia either directly or indi-

rectly are dependent on the coal industry.

"Last year 116,000 men produced 141,000,000 tons of coal. They received for that in the way of wages $200,000,000. The railroads which hauled that tonnage to 30 states of the United States received $350,000,000 in freight and the employes of the railroads in West Virginia received $150,000,000 in wages. The coal industry spent $30,000,000 for supplies and materials. We paid in taxes, and contributions to such things as Workmen's Compensation, Unemployment Compensation, etc., $25,000,000. I am not expecting you to remember these figures but I simply mention them because I want you to bear in mind the size of this industry here in West Virginia and to remember that two out of three people in the state are dependent on the coal industry.

"Whatever helps the coal industry in West Virginia helps two out of three people. Still more important to us all is that, whoever or whatever hurts the coal industry in West Virginia hurts two out of every three of our people in the state. The National Director of Selective Service, General Hershey, has stated that each miner makes a contribution to the war effort. He will mine enough coal in one day to make one six-ton steel tank, many shells and other weapons of war. His daily production will haul a million pounds of freight from Detroit to the Seaboard or 1,000 soldiers 80 miles. It is important therefore that that man and all those men be kept working. Every time that man does not produce his daily tonnage some steel or shells or tanks or soldiers do not move to a fighting front.

"Industrial Management, and that includes all of us, has done a good job in this war. Called upon all of a sudden at the beginning of the emergency to do a big job after a period of bedevilment during which management and industry was indicted as a class because of political expediency, denied a place in the councils of its Government, industry has not allowed itself to become embittered or to be hindered from producing what our fighting forces need in this country. Industry has its chiselers, they are a very small minority. I believe, that to the average man in industry today, profit and loss in his business is entirely secondary."

»»» The first of the annual safety meetings was held at Madison, W. Va., September 5, 1942, for members of the Coal River Mining Institute. This was won by a team from the Red Parrot Coal Company. Other contests were the New River-Winding Gulf Institute at Beckley, W. Va., on September 19; Kanawha Mining Institute at Montgomery, W. Va., held on September 26; Logan Institute, Logan, W. Va., on October 3, and the Pocahontas Institute at Bluefield, also held on October 3.

A plant for preparing talc which is mined near Waterbury, Vt.

These local institute contests create intense interest and friendly rivalry, drawing audiences of 4,000 to 7,000 or 8,000 people and have been an important factor in saving life and reducing mine accidents. Due to tire-saving needs, the total visitors will be less in number this year but there will be no loss of interest.

»»» Bond and stamp sale programs are prevalent throughout the Kanawha district with considerable interest and success manifested.

»»» The McQuails at the Turkey Gap Coal & Coke Co. mines at Dott and Modoc have refined their scrap salvage effort by having men at odd times comb the grounds around the mine buildings with garden rakes to

"90%

of the dust can be eliminated at the working face at a justifiable cost and with no resultant injurious effect on fine screening, air cleaning or other methods of preparation."*

. . . so says J. A. Saxe, Chief Engineer, Island Creek Coal Company. The dust-allaying agent used throughout its mines is COMPOUND M

Dust effectively wetted is safe dust and Compound M is the product so conclusively proved for laying coal dust that its use is recommended by government inspectors. In the mine referred to above, practically all cutting and loading operations for the 30,000 ton daily production schedule are dust-protected by Compound M.

If this important company feels that Compound M is the best way to kill mine dust, it must have superior merit. Why not make a comprehensive test in your mine? We'll be glad to give you full engineering data.

*Send for bulletin describing application of Compound M at Island Creek.

Compound M is a Johnson-March product; one of several special film-forming chemicals for industrial use.

THE JOHNSON-MARCH CORPORATION

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recover the small scrap, like bolts, spikes and other small pieces of junk. A good amount has been obtained in this manner though the cost to the company was high, but value to the war effort justified it.

»»» The Electrical Class, which has been conducted for several years by Paul E. Hillyard, of the Appalachian Electric Power Co., in Bluefield, for upgrading men to replace key men being called in the draft has been resumed. Classes are held once a week.

»»» The Chemical Products Company is a new company organized at Mt. Hope, W. Va., by P. C. Grainey, Wm. E. Tissue, Jr., and others to deal in calcium chloride, and other chemical products used around the mines.

»»» The Home Construction Co., St. Clairs Crossing, Va., has completed its first knock-down industrial home suitable for emergency housing at coal mines, industrial plants and camps. The company is offering its facilities and plans for Government projects first, but expect to make them available to mining companies immediately. James H. Shott and George McCulloch head the organization

»»» C. H. Denny, in charge of the Federal Mine Inspection staffs, Pittsburgh, accompanied by U. A. Miller, Mt. Hope; R. E. Tibbals and F. M. Stout, of Bluefield, were recent visitors to the offices of the Pocahontas Operators Association, getting acquainted and informing local operators of the policies and plans of mine inspection by the U. S. Bureau of Mines.

»»» The mining industry here and elsewhere employ and depend upon a group of workers who seldom make the front page in the news of mines—the accountants, payroll men and billing clerks. Over a period of recent years new problems in accounting have been added in an ever increasing volume to the general run of records and information that must be accumulated and used for the welfare of the operator. Records, records, and still more records. Daily mine performance and costs, weekly wage limitation, several monthly tax reports, quarterly estimates of supplies, semi-annual inventories, mileage on trucks,

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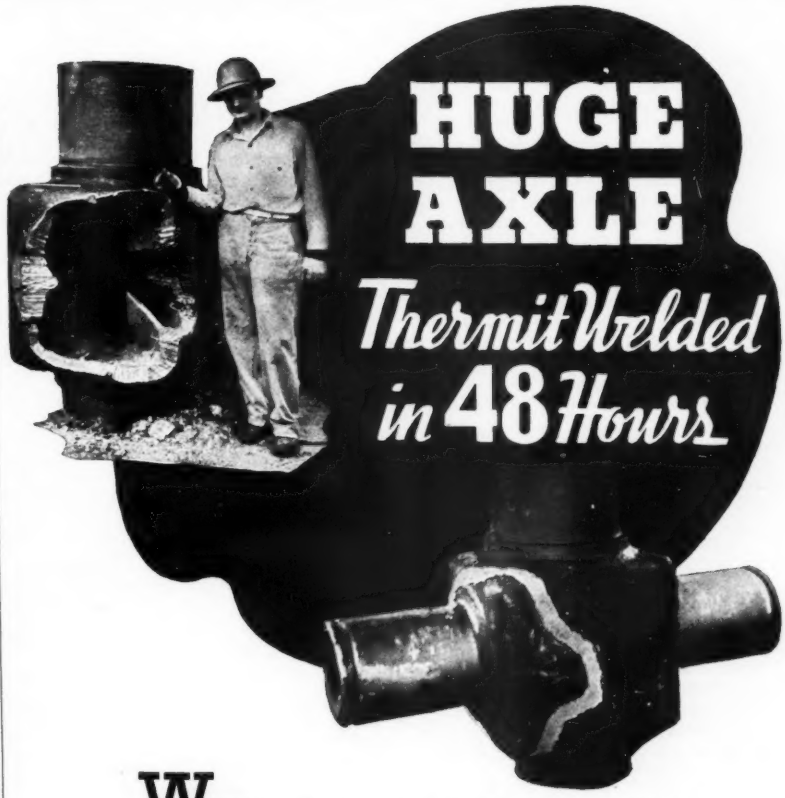

WHEN one of the huge axles of a steam shovel broke recently during a stripping operation, Thermit welding put the axle back in serviceable condition in 2 days—as good as new.

A standard practice for years in steel mills and in marine work, Thermit welding is being used today by many coal mines to repair crank shafts, machine frames, pump plungers, axles and other large parts.

Chief advantages of the Thermit process are the substantial savings in time and cost of replacement, permanence of the weld, simplicity in preparation of parts and lack of need for positioning or stress relieving.

Thermit welding may be done either on the customer's grounds or at one of the Metal and Thermit plants located at Jersey City, Chicago, Pittsburgh or South San Francisco.

Thermit welding of main haulage track saves power and eliminates joint maintenance. Booklet, "Continuous Rail for Main Haulage Track," sent on request.

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Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

and a rising flood of annual State and Federal returns, not a few of which are overlapping information, and throughout the year an expert knowledge of price regulation and code authority rules for the distribution of coal.

»»» Practically all operating companies are reporting their turned-in scrap material to the War Production Board through their local associations. The results of this scrap salvage campaign in West Virginia has been complimented by Mr. H. W. Eggleston, salvage director for the mining industry, but he reminds operators there should be no letup in moving scrap to the mills.

»»» Demand for coal has eased in spite of urgent pleas from war authorities to the buyers to increase their stocks. A recent Federal survey disclosed that stocks totaling 80,000,000 tons of coal are above ground, the gradual recession in buying is not therefore surprising. So far, Kanawha District production has met the most severe demands and mines that were called upon for greater tonnages met the challenge completely.

»»» The Office of Defense Transportation plans to register all trucks and buses about the middle of November. The West Virginia office of ODT is under John L. Howard, Peoples Building, Charleston. Other offices will be opened throughout the state in the near future it is reported.

TENNESSEE

»»» Early in August the newly organized American Coal Co., Knoxville, Tenn., started producing between 50 and 60 tons per day, for transport in wagons and trucks. Plans provide for a new tipple equipped with rotary screens for the production of four grades, and a new conveyor system of cable design for use underground. Daily capacity later in the year is expected to reach around 2,000 tons. R. P. Everence is president, general manager and engineer; F. J. Moses, Jr., vice president; Vance Earley, secretary, and O. J. Moody, treasurer.

KENTUCKY

»»» The Robinson-Combs Coal Company are reported to have started coal shipments from its property at Dorton, Ky., on the Chesapeake & Ohio Railway. The company is reported planning to develop a large area on the Elkhorn seam. J. H. Combs is manager of operations.

OHIO

»»» A new smoke ordinance, reported to be satisfactory to the coal trade, was adopted by the City of Cincinnati. The adopted regulations follow closely the patterns worked out through the cooperative efforts of the trade and allied activities.

Regulations now provide for the labeling of the volatile content of coal that dealers deliver to consumers, and calls for control of smoke emission, along with regulation of equipment to burn coal smokelessly.

PETER F. LOFTUS
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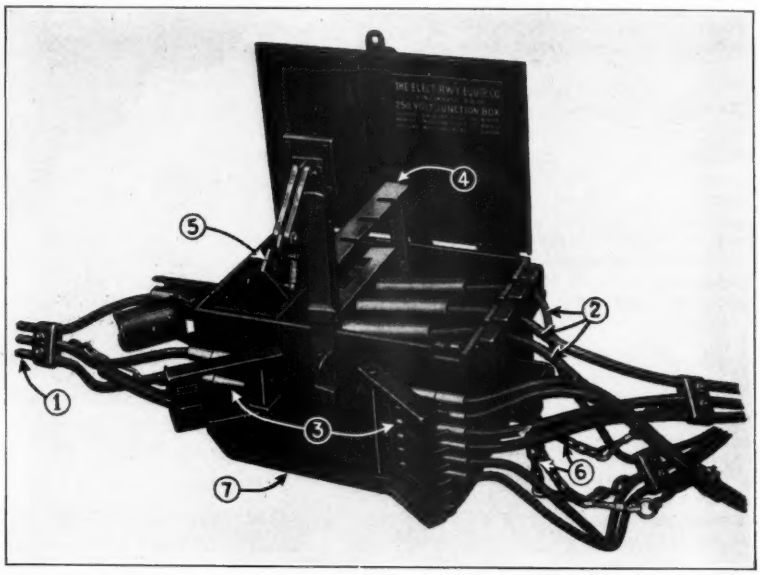
To drive tunnel 12 feet wide by 8 feet high
Track Gauge—28", 30" or 36"
Electric Supply — 230-250 volt D. C.
Conway Type 125 preferred, not over 6' 6" high above the rail
The Hudson Coal Co.
Scranton, Pa.



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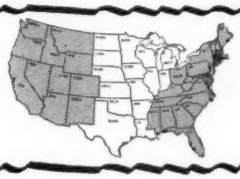
The ELRECO No. 1228 JUNCTION BOX for D.C. circuits is the essential safety link between the power source and the coal mining equipment.

7 Features Guarantee Safe and Efficient Service
No. 1. 3-Wire incoming power circuit cables (Pos., Neg. & Safety Ground). Safety chain and clamp relieves all strain on cable terminals.
No. 2. Out-going positive cables for machine, loader and drill circuits, equipped with removable socket connectors having insulated handles.
No. 3. Pin and socket type connectors for all negative and safety ground cables; mounted on the outside of box to secure complete separation from positive circuits.
No. 4. Safety lever which must be lowered before main switch can be closed. This lever automatically locks all terminal connections in position and prevents any circuit being opened under load.
No. 5. Quick Break Switch operated by the opening or closing of hinged junction box lid.
No. 6. Detachable strain chains and clamps for each individual circuit and which prevents any strain on cable connector terminals.
No. 7. Bottom skids to facilitate moving of box to different locations.

Standard equipment includes 200, 100 and 35 ampere 250-volt enclosed fuses —solder type terminal connections eliminate necessity of all vulcanizing or splicing of cables, and 28" height of box permits use in low coal seams.

The Electric Railway Equipment Co.
2900-18 Cormany Ave. Cincinnati, Ohio

Central States



MISSOURI

A. I. M. E.-A. S. M. E. Has Fuels Conference in St. Louis

The Hon. Harold L. Ickes, Secretary of the Interior, Coordinator of Solid Fuels for War, and Petroleum Coordinator for War, was the principal speaker at the dinner of the American Institute of Mining and Metallurgical Engineers at its annual Regional Meeting in the Hotel Statler, St. Louis, on October 1. The address was broadcast over the Blue Network's nationwide "hook-up." At luncheon the same day, W. M. Jeffers, president, Union Pacific Railroad Co., and Rubber Coordinator for the War Production Board addressed the members.

In conjunction with the 1942 Regional Meeting of the Institute, the Fuels Conference of the Coal Division A. I. M. E. and the Fuels Division of the American Society of Mechanical Engineers held a business meeting at the Statler in St. Louis, September 30-October 2. Mr. Parsons, Secretary of the Institute, estimated that attendance was close to 1,000.

At luncheon on October 2, Frederick E. Uhl, Major General in command of the Seventh Crops Area, spoke. At the Fuels Conference banquet Wednesday evening Eugene McAuliffe, president, The Union Pacific Coal Co. and president, A. I. M. E., presented the Percy Nicholls Award to Ervin George Bailey, vice president, Babcock & Wilcox Company. This award is made "For notable scientific or industrial achievement in the field of solid fuels." Mr. Bailey addressed the conference on "Coal Follows Through."

Newell G. Alford, prominent coal mining engineer of Pittsburgh, is chairman of the A. I. M. E. Coal Division. A. R. Mumford is chairman of the Fuels Division, A. S. M. E. Carl G. Stifel, president, Carl G. Stifel Company, was general chairman for the meeting, assisted by W. M. Weigel of St. Louis, mineral technologist, Missouri Pacific Railroad Company.

»»» The Kansas Explorations, Inc., expect to have their Jasper mill, near Joplin, Mo., in operation before the first of the year. This mine is a low-grade, low-face sheet ground property and except for the premium paid on zinc concentrates operation would not be economical. This is one of the few mines in the Tri-State District which has been developed by drifts and cross-cuts prior to active mining and milling operations. The Kansas Explorations, Inc., took a lease on this property early in the year and have been pushing the reopening of the mine and erection of a mill which will treat 1,000 tons of ore in 24 hours, but all the troubles of present day mining have greatly slowed the work of bringing the property to the production stage. Ross Blake is District Manager for the company in charge of operations.

»»» The American Zinc, Lead and Smelting Company has begun sinking three shafts southeast of Duenweg, Mo. This acreage was first drilled about 10 years ago under the direction of the late G. W. Johnson, former District Manager for the company. A small sheet-ground ore body was drilled at that time, but ore prices did not make mining feasible. With the recent increases in the price of zinc, this property again became of interest and recent drilling has increased the reserves to a point where mining operations are now worthy of attention. The ore will be mined from the 170-ft. level in two shafts and 130-ft. level in the third shaft. Priorities and scarcity of essential equipment have slowed up the development of this property. John J. Inman, District Manager, is now located at Batesville, Ark., in charge of the development and ore purchasing program of low grade manganese which the company is undertaking in that area. Ralph C. Calhoun, Assistant District Manager, is in active charge of the operation.

MINNESOTA

»»» In a paper by M. D. Harbaugh, vice president of the Lake Superior Iron Ore Association, read at the recent annual meeting and engineering conference of the Association of Iron and Steel Engineers at the William Penn Hotel, Pittsburgh, September 22-24, he pointed out the activity at the iron mines. "To meet the added demands for Lake Superior ore, most existing mines are being crowded to capacity, and new mines have been and are being opened. The coming winter season will see unusual activity in stripping of overburden for increasing open pit operations, and in mining and development work at underground mines. Following the trend of recent years, the open pit operations have gone increasingly to truck and conveyor haulage, with obvious difficulties now precipitated by the rubber shortage. Beneficiation of the sub-marginal ores most amenable to concentration by washing and gravity methods has expanded rapidly. The total output of such concentrates in 1941 was nearly 15 million tons, which is 50 per cent greater than in the highest prior year, and in 1942 it will be considerably greater than that."

MICHIGAN

»»» A dividend of 25 cents a share was paid on September 12 by the Calumet & Hecla Cons. Copper Co. The directors also announced a bonus, equal to the dividend on 50 shares, for each of the company's 2,200 employes. Both the dividend and the bonus were the third declared this year.

INDIANA

»»» The Vermilion County Coal Co. of West Clinton, Ind., has leased its mine on the No. 6 seam to A. M. Nielson and J. M. DeWolf. Operations have started and a substantial

Stripping operations are under way in the iron mining country. Trucks are used to dump the waste material

V 2 8 1 10 0 10 1

daily production of coal is expected to be reached in the near future. The Cleveland-Cliffs Coal Sales Co. of Illinois are exclusive agents for this new production.

ILLINOIS

»»» The Bankston Creek Collieries Co. and the Sahara Coal Co. have been awarded the Minute Man Flag for achieving 90 per cent or more employe-participation in the pay-roll allotment plan of buying war bonds. These two companies, however, through the full cooperation of their employes, have achieved 100 percent participation.

The National Safety Congress and Exposition will be held in Chicago October 27-29, with meetings scheduled at Hotels Sherman, LaSalle and the Morrison. This meeting was originally scheduled for October 2-4. Hotel Sherman will be the headquarters.

The Illinois Mining Institute will have its fiftieth annual meeting on October 23 at the Hotel Abraham Lincoln at Springfield, Ill. Some of the speakers scheduled to appear are E. H. Denny, Chief, Coal Mine Inspection Division, Bureau of Mines, Washington, D. C., whose subject will be "Federal Coal Mine Inspection to Date." Dr. R. E. Snoberger, Industrial Salvage Section, WPB, Washington, D. C., will discuss "Industrial Salvage with Reference to Coal Mines."

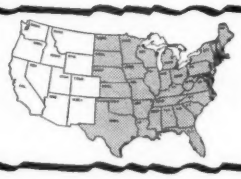
Prof. J. R. Fellows, Department of Mechanical Engineering, University of Illinois, will talk about "Present and Future Possibilities for Smokeless Combustion of Illinois Coal." D. L. McElroy, Chief, Coal Section, WPB, Washington, D. C., will discuss the all-important subject "Priorities for the Coal Mining Industry."

At the banquet Mr. Thomas Moses will be toastmaster. Dean Charles M. Thompson, of the University of Illinois, will be one of the speakers, taking for his subject "Some Fundamental Economic Truths."

TEXAS

»»» The Presidio silver mine at Shafter, Tex., operated by the American Metal Co., Ltd., has shut down operations. This property has been virtually in continuous operation for almost 60 years, without any difficulty from water. At 900 ft. an unusual heavy flow of water was encountered some time ago which has made pumping costs prohibitive. The development work carried on for many years has disclosed silver ore of much lower content than previously mined. Since its value would not be equal to handling the excessive pumping charges, the company decided to suspend operations. The Presidio mine has been considered the second largest single silver producer in the United States.

Western States



Western Metal Mines to Receive Army-Navy E

In recognition for the splendid work being done by metal mining companies in the West, several have been awarded the Army-Navy E. The Climax Molybdenum Co. of Climax, Colo., was presented its burgee on October 4. Appropriate ceremonies attended the occasion with talks by Army-Navy officials and Max Schott, president of Climax Molybdenum Co.

Several Arizona copper companies have also been selected to receive the award in recognition of outstanding performance in the production of nonferrous metals for the war effort. This is the first time recognition of this sort has been made regarding metal producers. The Arizona copper companies nominated by the War Production Board to receive this award are Inspiration Consolidated, Magma Copper, Miami Copper, Phelps Dodge Corporation, Kennecott Corporation and the Nevada Consolidated Corporation. All employes of these companies will be awarded special Army-Navy "E" pins.

Jobs Open for Women in the Metal Mines

The Government has appealed to women to take jobs in the copper mines to replace men taken into the Army, and at the same time pointed out that married women who replace single men in war industries prolong the deferment of married men. R. W. Hughes, general superintendent of the Miami Copper Co., Miami, Ariz., directed his personnel department to hire about 100 women to fill jobs heretofore held by men. Early in October virtually every job had been filled. No work underground is involved. The company is training women to take over work in the concentrating plants, machine shops and other surface buildings.

The Hecla Mining Co. in Idaho recently started training a group of women to work on the sorting belt.

The London Mines & Milling Co. of Alma, Colo., has been employing women for some time. On the front cover of this issue of MINING CONGRESS JOURNAL is a photograph of a woman working at the London Mines & Milling Co., where she operates the controls of a short aerial tramway.

ARIZONA

»»» Heavy producers of recent years, the old Gibson copper mine claims west of Miami, Ariz., have been leased for a renewal of operations. The old mine on the eastern edge of the property is not to be worked since the shaft and other workings have caved; but a newly-exposed copper vein on a western claim is to be opened. The property consists of eight patented claims. They have been leased from Ross Finley of Globe, and Anton Westoff of Miami, by L. A. Kuehne of Globe; G. L. Noel, postmaster at Holbrook, and William Curley, Holbrook rancher.

»»» Development work is to start at the Abe Lincoln mine of the Castle Creek district, 14 miles northwest of Wickenberg, through means of a $5,000 RFC loan to unwater and repair the workings, it has been announced. The mine formerly produced copper with a gold content of about $3 per ton, and has four veins developed to a depth of 600 ft.

»»» The University of Arizona's most popular publication, "Field Tests for the Common Metals," is off the press again in a revised edition, its printing having reached an excess of 30,000 copies. First printed in 1939, the bulletin has been reprinted in the whole or in part by mining publications throughout the world. It is used as a text book in many instances by colleges and high schools, and is widely used as a handbook by Arizona miners and prospectors because of its simplicity in setting forth the simple field tests for more than thirty minerals and substances.

»»» A tungsten property owned by Ben E. Joy in the Camp Wood district of Yavapai County is undergoing new development through a Reconstruction Finance Corporation loan of $20,000.

»»» Arizona's restoration of appropriations for the Arizona Department of Mineral Resources has made possible a full wartime program for the state, it is said by J. S. Coupal. director, and he outlines the following evidence:

Establishment since April of this year of local ore buying plants for strategic minerals; partial solution of problems relating to premium prices;

liberalization of the Federal mine loan program to include small loans; organized opposition to increased freight rates; work toward a solution of the labor shortage problem; promotion of "mine to market" roads; and handling of the state industrial salvage program. "The department now has but one program and policy—to do anything and everything which will bring out new production or maintain existing production of the strategic minerals and metals from Arizona mines that are needed in the war effort," Coupal said.

»»» Government acceptance of manganese concentrates of 35 per cent or better under a new ruling of the Metals Reserve Company, will release 200,000 tons of ore running 18 to 30 per cent and making a 48 per cent concentrate, held by the Patagonia Metal Mills of southern Arizona, it is reported by Charles F. Willis, Phoenix, MRC consultant.

»»» Although its content is not to be made public at this time, a report on the status of Arizona copper production and means of increasing output of the state's mines has been completed by the Arizona Department of Mineral Resources. It was requested by the Army and Navy Munitions Board.

The report covers ceiling prices, bonus payments, taxation, the mine loan program, priorities, labor shortage, draft deferment of key men, and stockpiling and disposal of small lots of ore, according to J. S. Coupal, department director.

»»» An office of the Mineral Production Security Division of the U. S. Bureau of Mines, has been opened in the Security Building, in Phoenix, Ariz., to serve Arizona miners in their wartime problems. Staff members are Albert Konselman, formerly of Colorado Springs, Colo.; D. W. Jaquays, Phoenix, and John Harmon, formerly of Miami, Ariz. They will serve under F. S. Crawford, engineer in charge.

»»» In a state-wide industrial scrap salvage campaign conducted by the Arizona Department of Mineral resources, Arizona mines contributed 2,014,617 lb. of material during the period June 20 to September 20.

Broken down it amounted to 1,847,594 lb. of iron and steel; 70,491 lb. of non-ferrous metal; 69,892 lb. of rubber; 26,640 lb. of burlap, rags, etc.

Organized in June, the Arizona State-wide Industrial Scrap Committee was headed by Thomas H. O'Brien, general manager of Inspiration Consolidated Copper Company of Inspiration. The state department of mineral resources was delegated by the committee to perform the detail work regarding industrial scrap salvage.

The salvage roundup from Arizona mines during the active period of the campaign is not an accurate picture of the mining industry's contribution, however, as much scrap from mines is acquired by junk dealers, and no segregation is recorded as to the total scrap tonnage coming from mines. In addition, the U. S. Forest Service collects a large tonnage of mine scrap, reports of which never reach the Arizona department, it was reported by W. J. Graham, assistant director.

»»» Pack animals such as the little burro, sometimes referred to as the "Rocky Mountain canary bird," are back in the field, augmenting the wagons and trucks in carrying away the vital war minerals produced in Arizona and other western states.

Production of metals in the state may far exceed that of other states in helping to keep the huge war mills running, it is said; but the object of search of the many prospectors in the field is no longer gold. They are hunting for mica, tungsten, beryllium, mercury, manganese, magnesium-bearing dolomite, and many other minerals.

NEW MEXICO

»»» The Gray Eagle copper, lead and zinc mine which has been closed for a number of years is being reopened by Karl A. Strand of Santa Rita and Carl S. Elayer of Silver City, the lessees. Work consists of cleaning out old workings and general rehabilitation.

»»» The Continental Chemical & Ore Co. at Silver City, New Mexico, recently placed operations of its 250-ton fluorspar plant at Silver City on a 24-hour basis, treating ore at present chiefly from company's own fluorspar property near Glenwood. Smaller producers of fluorspar in the district also

Timber!

plan to ship to this mill. At present acid-grade fluorspar is being shipped, but the company plans to produce fluxing and ceramic grades of fluorspar later on. Fourteen men are employed under T. J. Benjovsky of Silver City. Joseph Fischer is president of the company.

»»» A deposit of beryllium ore is reported being prospected in the Iron Mountain district about 12 miles north of Winston in Sierra and Socorro Counties, New Mexico.

»»» The New Mexico Ore Processing Co., a Colorado corporation, recently started operating at its new mill at Central, New Mexico. D. W. Schmitt, P. O. Box 508, Silver City, vice president and manager of the company, formerly operated mining properties in Boulder County, Colo. In addition to Mr. Schmitt, other officers are Henry D. Klinker of Ft. Collins, Colo., president; E. H. Massey of Colorado Springs, Colo., secretary-treasurer, with Dr. S. R. McKelvey of Denver and John C. Hershey of Colorado Springs, directors.

IDAHO

»»» Federal Mining & Smelting Company is engaged in bringing back into production one of the old mines of the Coeur d'Alene district. The company has pumped out the old Helena-Frisco shaft down to the 200 level and have opened a new ore body with a short crosscut north from the old mine workings. This vein was discovered by leasers several years ago and has been extensively worked by them above and below the tunnel level.

The Federal crosscut is about 130 ft. long and has opened a width of 3 to 4 ft. of commercial ore which is reported, unofficially, to run 7 per cent lead in addition to higher zinc values. Drifting and crosscutting is being continued, and the ore is being trucked to the company's Morning mill at Mullan.

The old Frisco mine workings extend 1,650 ft. below the present strike, and if the new discovery proves of major importance the company proposes to pump out the entire mine and open the new vein for heavy production.

»»» The Lucky Friday Mining Company, operating a new discovery at Mullan, has received net returns of $18,239.85 for 90 tons of concentrates shipped to the Bunker Hill smelter early in September. The shipment consisted of one carload each of lead-silver and lead-zinc ore. The silver is the highest content ever found in any zinc ore in the Coeur d'Alene district.

All of the ore has been produced in development and prospect work on a

The old Helena Frisco lead-zinc mine in the Coeur d'Alene district of Idaho is being rehabilitated

group of claims located just outside the city limits of Mullan in a section of the Coeur d'Alene mineral belt that has no other production record. The first two tunnels on the Lucky Friday were driven many years ago and opened a quartz vein which carried some high grade ore but not in commercial quantity. The present company sunk a shaft 100 ft. deep with the same result. The shaft was continued another 200 ft. and on the 300 level the vein developed commercial ore shoots. The shaft was then continued still another 200 ft. and developed the same ore on the 500 level in a shear zone 17 ft. wide. The company is preparing to continue stoping operations while sinking to the 700 level.

»»» The Hecla Mining Company has started production from one of the most extensive tailings reclamation projects ever attempted in the Coeur d'Alene mining district. The operation is at Osburn, two miles west of Wallace, where 1,500,000 tons of tailings have been stored against a dam built by the mining companies years ago as a protection to ranch land farther down the river.

All movement of the material and transportation of the resultant product will be under contract at so much per ton. The primary operation will be treatment of the tailings material through a sink-and-float milling unit the Hecla company is installing on the job. The plant will have a capacity of 2,000 tons a day. Experiments made on the tailings material at the Hecla's Star H & H sink-and-float plant have demonstrated that this treatment will eliminate better than one-third of waste material from the tonnage treated. The remaining tonnage will be shipped by truck to the Hecla and Polaris mills, about 900 tons daily to the Hecla mill at Gem and 300 tons to the Polaris mill at Osburn. According to pilot mill tests, the concentrated product will average about 2½ per cent zinc to every 1 per cent of lead. This is the largest accumulation of tailings along the South Fork of the Coeur d'Alene River east of the mud flats below the Bunker Hill smelter at Kellogg, where an even larger deposit of lead-zinc slimes are being treated in a modern mud mill by the Gibbonsville Mining Company.

»»» The latest new mineral production developments in the Coeur d'Alene district are copper and antimony. Both of these minerals are by-products of the district's newly developed silver belt, commonly known as the "dry ore belt" and branded by many prominent and nationally known geologists as an "ugly duckling." Like the zinc in the lead-silver belt, the antimony in the silver-copper (tetrahedrite) ore was a nuisance and a detriment, for the reason that it cost the mining company a penalty charge in the smelter treatment and added that much to the cost of production. Bismuth was also another mineral present in the ore, in smaller percentage, which drew a penalty charge. The war demand for antimony changed all this. Bunker Hill smelter chemists and metallurgists developed a process whereby the antimony and bismuth contents of the ores could be saved, and following this, Sunshine metallurgists developed an acid-electrolytic process to treat concentrated ore and remove the antimony in metallic form, ready for the market, leaving a silver-copper concentrate for smelter treatment. Under the au-

thority of a project certificate issued by the War Production Board the Sunshine company has erected a large antimony reduction plant.

NEVADA

»»» Two tungsten properties owned by United States Vanadium Corp. are reported to have been leased to W. C. Riggs, president of the Arizona Molybdenum Corp. of Copper Creek, Ariz. Mines involved are the Richmond, an open pit operation 48 miles northwest of Winnemucca, and the Rose Creek, an underground mine, 12 miles southwest of the same town. Both mines have been developed and together are expected to produce around 300 tons of ore per day.

»»» The large milling plant at Delamar, formerly operated by the Caliente Cyaniding Company, is reported being dismantled and the equipment sold. Delamar, which had been only an old bonanza camp for many years, revived a few years ago with the finding of rich ore by lessees and the advent of the Caliente Cyaniding Company, which treated the old tailings dumps. With this work completed and the war restrictions on materials for gold mining, it appears that the famous old camp is destined to again become inactive.

»»» Officials of the Standard Cyaniding Company indicated here that operation of the gold mine and 700-ton cyanide mill near Rye Patch in Pershing County will be resumed. Operations had been halted previously after trucks used for transporting the ore were transferred to Government projects and two slides had covered valuable ore at the open-cut gold mine.

UTAH

»»» The Apex Mining Co. has completed its shaft program at the Paymaster mine after sinking 500 ft. to the 1,400 ft. level. A station now is being cut at the bottom level in preparation for driving a 1,500 ft. crosscut to develop ore exposed in the upper workings. In the meantime the company is mining some ore from the old drifts above. James J. Smith of St. George is superintendent.

»»» The magnesium test well at Crescent Junction, being drilled by Federal agencies under contract with the Utah Magnesium Corp., recently reached the contract depth of 4,200 ft. and operations have been suspended pending a determination as to whether it shall be carried deeper to penetrate the massive salt beds which have been encountered. New equipment will be used in deepening the present well and in drilling additional wells provided the Defense Plant Corp. and U. S. Bureau of Mines decide to continue exploration work.

»»» The R. F. C. through its Mine Loan Section has granted preliminary Class C mine loans of $5,000 to two mining operations in Utah. The American Metal Mining Company, with its loan will begin rehabilitation of its property in the Big Cottonwood district. C. S. Woodward of Salt Lake City is president of the American Metal Mining Company and the Mountain Mines Company. The latter company is driving a tunnel not far from the American Metal Mining property. The other recipient is the New Bullion Lessees in the north Tintic district. James T. Morgan of Eureka, Utah, heads this company.

»»» The Training Within Industry section of the War Manpower Commission has under way a foremen's

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training program in the Carbon County coal field of Utah. The purpose is to increase overall efficiency in the coal mines. Representatives from the participating mines will receive comprehensive training which they will pass to other foremen of their respective companies. This knowledge will then be further passed to mine employes.

Among coal mining companies reported to be participating in the program are Columbia Steel Co., Hi-Heat Coal Co., Independent Coal & Coke Co., Liberty Fuel Co., Peerless Sales Co., Spring Canyon Coal Co., United States Fuel Co., Utah Fuel Co. and the Lion Coal Corp.

MONTANA

»»» The Monongahela Mt. Washington Mining Company is conducting a shaft sinking program and is now completing an underground station. About 150 tons of ore containing lead, zinc, silver and a little gold are being produced daily and treated in the company's 200-ton flotation plant. A crew of about 70 men are employed. J. C. Archibald of Helena is general manager. J. C. Archibald, Jr., of Wickes is mine superintendent, and A. D. Harris is mill superintendent. H. K. Gaw, Jr., of Helena, secretary to the company, is purchasing agent.

»»» The St. Joseph Lead & Zinc Co. mine has increased wages and is seeking to employ more miners, according to Manager F. H. Skeels of Hughesville, Mont. Wages of underground workers have been boosted from $6.25 to $7 a day. Surface workers are paid $6.25 a day for common labor and upwards for skilled workers. More than 160 men now are employed at the workings and efforts will be made to increase the personnel to more than 300. St. Joseph placed its property in production in May after spending several months rehabilitating the mine.

Accommodations for the miners and their families are being provided through a housing program now under construction by the company. The project, being built at a cost of upwards of $25,000, includes 40 units of four rooms each for families of workers.

»»» The Silver Star Chrome mine is soon to be benefited by the construction of a good road to the property. Government funds have been provided for this work. Present work consists of driving a tunnel to the chrome bearing veins so as to develop them in depth. Officials of the company are E. Dessault, president; J. O. Mudd, secretary-treasurer, and J. V. Davis is director and mine manager.

»»» E. H. Williams of Dillon, prospector, recently announced the location of several claims in Frying Pan basin which contain bauxite. Samples of the ore have been sent to the Bureau of Mines in Washington, D. C. The claims were filed by Williams, W. E. Stinson and Harry Brown.

»»» Channel Gold Mines have resumed operations at their property in the Bald Butte district. Stanley H. Fairweather of Wallace, Idaho, is president and general manager.

»»» The U. S. Vanadium Corp. is operating its 250-ton mill to capacity, treating chrome ore that is mined by underground and open pit methods. About 40 men are employed. Leonard K. Norton is general superintendent; Milton Funk, mill superintendent; H. A. Stephens, purchasing agent and chief clerk. Headquarters are at Red Lodge, Mont.

»»» Drilling operations have started in the Judith Mountain area near Maiden, Mont., by the Hamilton Copper Company. The objective is to cut copper veins in depth which have been prospected on the surface. R. S. Hamilton is engineer in charge and Harry F. Goll is manager.

COLORADO

»»» Production of vermiculite is expected soon from a property along Beaver Creek in Powderhorn Valley, near Gunnison, Colo. Richard Colgate of Gunnison is in charge of operations.

»»» Cobalt Gold Mines have resumed operations, producing a nickel ore found in a deposit near Boulder, Colo. In 1941 the company operated a small smelter near Boulder, recovering nickel from its ore on more or less of an experimental basis. At that time the metal produced was sold to an eastern company. Ward Yeager is in charge of operations, with offices in Boulder. James McLaughlin is assistant.

»»» Mine development work on the 28th level of the Ajax mine of the Golden Cycle Corporation in Cripple Creek has encountered scattered values on the Bobtail vein. On the 2,700 level, development work includes crosscutting to the Bobtail and New Market veins. These two levels are in new territory made possible by the drainage of the Carlton tunnel, completed last year. C. H. Carlton of Cripple Creek is superintendent. Some lessees are also working on the Ajax.

»»» The Callahan Zinc-Lead Company has virtually completed unwatering and electrification of the Akron mining property in the White Pine district of Colorado, near Gunnison. The company has a crew of 14 men employed under the management of L. B. Stitzer, who has been leasing at the property since it was closed in 1930. The property is developed by tunnel and a shaft 125 feet deep. Small shipments of ore are now being made from the upper workings, and Mr. Stitzer says production will be increased as soon as additional development gets under way.

»»» The Resurrection Mining Company, near Leadville, Colo., in which the Hecla Mining Company is co-owner with the Newmont Mining Corporation and the U. S. Smelting, Refining and Mining Company, is providing additional living quarters for its workers as zinc mining operations increase. Construction of cottages near the company's mill is also planned. Arthur Kendall is general superintendent.

»»» John W. Anderson, pioneer prospector, miner and leaser in the Cripple Creek area, is puzzled by the actions of Government authorities which resulted in closing the gold mines because they are considered part of a non-essential industry in wartime. He asks, "Why does the Government want to deprive me and hundreds like me of the chance to go on working our mines and making enough to go on living and to pay taxes to support the war?" Mr. Anderson has two sons in the Army and two in the Navy, and other members of his family are doing various forms of war work. Mr. Anderson is an "old timer" in the Cripple Creek district. His question has been asked by many miners throughout the western gold mining camps.

Like Mr. Anderson, many in the mining industry believe that if Washington officials carefully analyze the man-power requirements of the gold mining industry they will find many properties already shut down and the miners thereby layed off, working in shipyards and defense plants instead of in the copper mines.

The major gold producers have pointed out there are not over 2,500 men employed in the gold mines, of which not more than one-third are experienced miners. It has been pointed out to Government officials that so long as men have a choice as to what they may do, only a small fraction of these would seek employment in other mines. Observers believe that the recent shutdown order will do irreparable damage to the larger gold mines and injure morale of the communities. In the end a net loss for the mining industries' war effort, would probably be the result, instead of any material gain.

WYOMING

»»» Eugene McAuliffe, president of the Union Pacific Coal Company, asked business men and civic leaders of the Rock Springs area to aid in solving the labor turnover problem of the company, which is the major employer in the Rock Springs coal fields. Reiterating earlier predictions that the Union Pacific will, this year, be called upon to produce in excess of 5,000,000 tons of coal, the president of the railroad company subsidiary called attention to the fact that many men had left the company service for the U. S. armed forces, while other defense industries had been making inroads upon the employe rolls.

Eugene McAuliffe

Mr. McAuliffe pointed out that the heavy demand for coal is because of the record-breaking freight traffic over the railroad and the tremendous increase in war industry and population in the northwestern area served by Wyoming coal mines.

»»» The chromite deposits of Casper Mountain in Natrona County, Wyo., have recently been studied by E. L. Stephenson and H. K. Stephenson of the Geological Survey, U. S. Department of Interior. The rocks in this district are poorly exposed, but the magnetic properties of the iron-rich chromite made it possible to supplement the usual geological mapping with magnetometer surveys. In this way, areas containing chromite were outlined as a guide to the detailed trenching and diamond drilling which have been done by the Bureau of Mines.

The chromite at Casper Mountain occurs in nearly vertical, roughly tabular bodies of talcose schist, which are surrounded by igneous rocks, including quartz monzonite, metadiorite, and amphibolite. A similar lens of quartz-mica schist, which crops out nearby, is barren of chromite. The largest mass of chromite-bearing schist is 2,500 ft. long and from 100 to 400 ft. wide. It narrows downward, but diamond drilling has shown that in one place it extends to a depth of at least 500 ft.

CALIFORNIA

»»» California's gold mining industry, estimated at $50,000,000 a year, is rapidly shrinking because of the priority system of allocating supplies and repairs necessary to keep the mines open. The famous Mother Lode country of the state is rapidly becoming a "ghost town" country. Records of the United States Bureau of Mines show a monthly decrease of about

Peak Production Tonnage Aid

It is a handbook of equipment which gives protection from needless outages and slowdowns in electrical operation of mechanized mines.

CATALOG 2502

I-T-E Catalog No. 2502 is a complete description of d-c circuit breakers, switchgear and protective relays for mining applications. Its completeness recommends it particularly to those who are engaged in or contemplating mechanized mining.

Our plant, busy as it is with direct war effort in the building of switchgear, has capacity for prompt action in meeting the demands of the vital mining industry.

Representatives in Principal Mining Areas

I-T-E CIRCUIT BREAKER CO.
PHILADELPHIA, PA.

V 28 I 10 OCT 1942

$100,000 in gold production from January, 1941, to last May. Labor shortage, priority restrictions and the fixed price of gold are causes.

The Argonaut mine at Jackson, a marginal mine producing low-grade ore, has closed down. The Central Eureka mine at Sutter Creek was closed October 1. At Grass Valley, the big Idaho-Maryland mine, which normally employs around 1,000 men, now is operating with about 250. The Empire North Star, which had a payroll about the same size, is now getting along with a skeleton crew of about 300.

Albert Knorp, secretary of the California Chapter, American Mining Congress, and of the Gold Producers of California, says there now are not many more than 700 miners and muckers at work in the state's gold mines. Not a few are oldtimers who have come out of retirement to take jobs deserted by younger men.

»»» The United Copper property has been reopened to a depth of 1,000 ft. and preliminary production has started on the 400- and 1,000-ft. levels. Development continues through the No. 2 tunnel. The property is near Chewelah, Stevens County. A. S. Newell is superintendent.

»»» The Grey Eagle Copper Co. is erecting a large concentration plant, tram line, hotel and other surface buildings at its Grey Eagle property in the Happy Camp field. Mining is well under way and the management plans to start production early in January. The company expects to employ 260 men when in full operation.

OREGON

»»» George Watkin Evans, consulting mining engineer of Seattle, has been retained by the U. S. Bureau of Mines to study possibilities of developing and exploiting coal beds in the Coos Bay coal field. M. R. Geer, mining engineer at the Bureau's Seattle station, is assisting in the work.

WASHINGTON

»»» Exploration continues for zinc-lead ore in a virgin area of northern Pend Oreille county by the Metaline Mining & Leasing Co. The work being done is about 12 miles northeast of the Grandview mill where the company's ore is being concentrated. Two drill holes have been completed and the third is being extended in depth, says Dale I. Hayes, western manager of the American Zinc, Lead & Smelting Co.

Wheels

(*Continued from page* 49)

announcing that coal miners and other workers deferred from military service because of their occupation, but who habitually take time off for unexplained reason, will lose their deferred status and be subject to immediate draft.

General Hershey stated flatly that this order reflects a fundamental principle that deferment is granted because the registrant is more vital in his occupation than in the armed forces, but that stoppage in performance of this type of labor is grounds for removing a deferment.

The Office of Petroleum Coordinator is also active in bringing to public attention the need for more coal production. In the OPC plans are being made to increase coal mine capacity, including development of new mines and the making available of mining machinery to meet needs. The OPC will make representation to the WPB to provide steel and other materials necessary for the manufacture of needed mining machinery, and has announced that representatives will be sent into the coal fields and to industrial plants within the next 90 days in an effort to develop a program which will help in solving the fuel oil shortage.

The Coal Conference called by Interior Secretary Ickes, September 29, to devise means of increasing production, including the increase of the working time of the miners is expected to continue on October 21. Speaking for the miners, John L. Lewis told the conference that his organization would be willing to modify working hours "if necessary," but he added that no figures had been made available in the course of the meeting to show that the increased tonnage could not be obtained under the present workweek. It is reported that both operators and the representatives of labor criticised the failure of Secretary Ickes to call a conference on a nationwide basis. It is understood, however, that the anthracite industry will meet separately with the United Mine Workers to consider methods by which an immediate increase in production may be achieved.

WPB Problems

The War Production Board is now urging that business men make greater use of the field and regional offices which have recently been furnished with nearly 500 priority specialists.

In the Mining Branch it is possible that an AA-2X will soon be forthcoming for 100 percent of the fourth quarter quotas which up to the present time are 70 percent A-1-a and 30 percent A-1-c. The Mining Branch has practically completed processing of the PD-25-A forms and it is understood that ratings assigned range from AA-4 to AA-2X.

It is officially stated that the Production Requirements Plan will be continued through the first three months of 1943; that schedules for thousands of manufacturers have already been approved and will be mailed as soon as they are received from the printers.

Gold in "Commerce"

Several weeks ago a gold producer, the Canyon Corporation in South Dakota, was told by a U. S. Circuit Court of Appeals that "the production and shipment of gold bullion by a mine and refinery in one state for the purpose of selling it to a United States Mint in another state is, in our opinion, plainly and literally 'commerce' within the definition of . . . the Act." Very recently in South Carolina a Federal District Court reaffirmed its decision of some months ago in the case of Haile Gold Mines, Inc., by stating flatly that the sending of gold bullion from South Carolina to the Philadelphia Mint by mail does not constitute commerce; whereupon the Court dismissed the injunction proceeding of the Wage Hour Division, Department of Labor.

Interesting to all mining men is the recent conference of straight gold producers with WPB and WMC officials in Washington concerning a proposed WPB order which would deny operating materials and supplies to such mines. Western Senators and Representatives in Congress entered into the discussion in the course of which it was clearly demonstrated that very few of the gold mine workers will be secured for the non-ferrous mines in the west if the gold mines are shut down. It was urged that this situation remain undisturbed until a broad and general allocation of manpower is put into effect, probably in the course of the next three or four months.

No St. Lawrence Seaway

This month a White House announcement carried the information that the present administration will not press for construction of the St. Lawrence Power and Seaway Project during the present emergency. A statement was made that the power features are needed but because more than three years will be required in construction before power could be available, the project is being dropped at this time. It was indicated, however, that the Federal Power Commission is still studying New England's power needs and the feasibility of the power production of the St. Lawrence Project.

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If you are having difficulty obtaining standard replacement parts, we may be able to help you. Our large supply of new and used parts contains thousands of items which now cannot be obtained. Write us, giving the necessary information to identify the parts you require and we'll do everything possible to help you out of your difficulty.

A partial list of the principal items on which parts are available is shown below:

Boiler and Coxe Stoker parts
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Roberts and Schaefer Rotary Dump parts
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Cast Iron Flanged Pipe and Fittings
Pump parts for Buffalo, Scranton and Knowles pumps
American Locomotive (11 x 16) repair parts
Shaker Material and Screens
Stationery Engine and Hoist parts
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Track Material
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Simplicity Gyrating Screens are available in sizes from a 2′ x 3′ up to a 5′ x 12′ in single shaft assemblies; built in one, two, three, and four decks; as standard inclined types and also as low head types, where desired.

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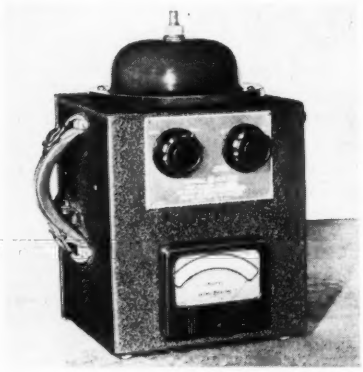
Manufacturers Forum

New Electronic Crest Voltmeter

A new electronic crest voltmeter announced by the General Electric Company is designed to measure ignition voltages of internal combustion engines; surge voltages caused by corona and surface discharges in the insulation on such electric equipment as motors, generators, and cables; and other repeated-impulse voltages up to 30,000 volts.



The instrument, weighing only 23 lb., fills the need for a portable crest voltmeter for both laboratory and production testing. It is suitable for field measurement, such as trouble shooting and the determination of actual operating conditions, and can also be used for testing aircraft engines in flight.

The crest voltmeter can be used in areas where no electric power is available, since it has a self-contained battery power supply. It can be moved readily to any location for testing purposes—a valuable feature when the equipment to be tested is too large to be moved conveniently.

The voltmeter is equipped with an aircraft-instrument movement to provide resistance to vibration. It can be supplied marked and calibrated for any of the following scale ranges: 0-10,000 volts; 0-20,000 volts; 0-30,000 volts.

New Metal Etcher

The Ideal Commutator Dresser Company, Sycamore, Ill., announces a new electric etcher that is said to mark permanently anything made of steel, iron or their alloys.

To etch small tools and parts simply place them on the work plate, turn switch "on" to proper heat and start writing. A ground clamp conveniently attached to the work plate is provided for etching large, heavy parts and castings. Everything may be completely enclosed in a compact, attractive case when not in use.

"Hi-Lo" taps and a seven (7) point switch give 14 etching heats between 115 to 1,300 watts. A red lamp on front of etcher indicates when power is "on" and burns brighter as each higher heat is used. Depth of mark can also be controlled by speed of writing.

Storage Battery Division of Philco Awarded Joint Army-Navy E

In recognition of its outstanding war production record, the Storage Battery Division of Philco Corporation has been awarded the new joint Army-Navy "E," it was announced recently by Mr. M. W. Heinritz, general manager of the Trenton plant. Special ceremonies will be held in the near future for the presentation of the award by Army and Navy officials.

Coming as it does at this time, the award to the Storage Battery Division has special meaning for Philco, for the company was started in 1892 to manufacture storage batteries and is currently celebrating its 50th anniversary. Last year the division moved from Philadelphia to a much larger plant in Trenton where production has been greatly increased.

In addition to the Storage Battery Division, Philco plants in Philadelphia and Sandusky have been awarded the Army-Navy "E" for excellence in war production. Formerly the world's largest manufacturer of civilian radio receiving sets and a leading factor in the refrigeration and air conditioning industries, Philco is now 100 per cent converted to war work. It is producing communications equipment for tanks, airplanes, and ships, shells and fuses, as well as heavy-duty storage batteries.

Care of Conveyor Belts

A report received by The B. F. Goodrich Company from the superintendent of conveyor equipment for one of the large eastern coal companies, throws some light on several factors of rubber conservation by sound belt practices, so essential now because of the war and scarcity of rubber.

This superintendent, with 15 years experience in conveyor belt splicing, keeps accurate belt records. He reports that the cost of metal splices for one 26-in. belt during four years of service is $147.20, while the cost of a vulcanized splice for the same period of service is only $17.80, a saving of $129.40.

Regular inspection and prompt vulcanized repair are the keystones of the superintendent's belt maintenance program, he says, and relates that previous to the installation of such a system belt life was short and replacements costly.

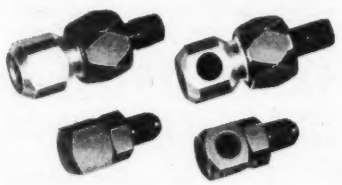
As examples, he cites the former service life of 48-in. six-ply belts on loading boom conveyors, as from three to four years, while the present service life is nine to 10 years. On 42-in. eight-ply transfer conveyors at the mines, the best previous service life was four years, but since the inspection and repair program was adopted these belts have already given eight years service and are still performing.

His report recognizes the progress made in belt construction but also declares that even with the improvements built into the product by the manufacturers legitimate service life can be obtained only by a rigid program of inspection and maintenance.

One of the unusual savings made possible, he reports, was on an 1,800-ft., 48-in. eight-ply refuse conveyor belt installed in 1932. A year later it was damaged so badly that it would ordinarily have been replaced. Instead, 50 major vulcanized repairs were made, the belt has performed its regular duties since, and is expected to give at least one more year of service.

Straight and Angle Swivels

Trabon Engineering Corporation, Cleveland, Ohio, manufacturer of automatic lubricating systems, lubricating fittings, oil and grease pumps, etc., has introduced a new line of straight and 90 degree angle swivels for use in making oil, grease, air and other line connections between stationary and revolving, oscillating or other moving surfaces.



These swivels are available in two different constructions for different requirements. The standard ball bearing swivels are available in ⅛-, ¼-, ⅜-, ½-, ¾-, and 1-in. pipe sizes. Due to the ball bearing construction, these swivels are said to turn freely at any

pressure without binding and should always be used if space permits. The stem and nut on which the balls turn are hardened to minimize wear.

Light duty swivels are built without balls. They are intended for use only in lighter work when space limitations do not permit the use of standard ball bearing swivels, and are offered only in ⅛- and ¼-in. pipe sizes.

Both standard ball bearing and light duty swivels are furnished regularly with right-hand threads on both head and stem. Swivels with left-hand threads in either the head or stem, or in both the head and stem, and swivels built from special materials for handling corrosives, etc., can be furnished on special order.

New Reflector

For general lighting of medium and low bay areas in foundries, machine shops, power plants, receiving and shipping departments, and similar industrial locations, a new porcelain enameled high bay reflector line is announced by the Westinghouse Electric and Manufacturing Company.

This new line is designed for either

incandescent or high intensity mercury lamps and is available with either the locklite two-piece quick detachable construction or one-piece type for conduit or outlet box mounting. The multiple coat porcelain enameled reflecting surface is permanent, easily cleaned and has a reflectivity of 80 percent.

Critical Materials Saved in New System of Transformer Cooling

Vitally needed increases in power transformer capacities can now be obtained quickly with a new system of forced-oil cooling that saves 25 percent in critical war materials on new transformers, the Allis-Chalmers Manufacturing Co. recently announced. The new cooling unit, called the "Electro-Cooler," is said to step up capacity of transformers already in service by about 20 to 60 percent.

The forced-oil system of cooling transformers is made highly practical with the "Electro-Cooler," because the unit is built compact, factory-assembled and factory-tested at high pressure to minimize the possibility of future maintenance. If the transformer has radiator valves, the unit can be removed without draining the transformer oil, and parts can be replaced without delay in transformer operation.

The unit consists of a radiator-type cooler and a special pump with motor enclosed. These are connected by piping to the standard radiator valves at the side of the transformer. No stuffing boxes are required in the special pump, and the motor is self-cooled and self-lubricated.

Because the new cooling unit is relatively small, usually more than one is required, the number depending upon the size of the transformer. Greater reliability can be expected from the multiple units, since operation of one is not dependent upon the other.

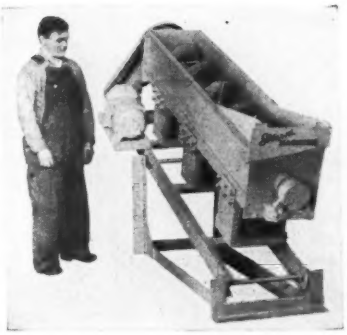
A wartime development designed to save copper and steel, the "Electro-Cooler" is expected to have wide use in post-war applications also. For the current emergency, it can not only be built into new transformers, but can be readily applied to transformers already in service, subject to the recommendations of the transformer manufacturer. If the transformers are equipped with the conventional type radiator valves, installation can be made in three to four hours without even removing the oil in the transformer.

Magnetic Log Washer

An improved type of magnetic log washer for treating fine abrasive and similar materials in the wet state, has been designed by the Stearns Magnetic Mfg. Co., Milwaukee. This magnetic log washer consists of a single ribbon type screw conveyor operating at 30 to 32 r.p.m. on a slope with adjustable frame supports over the magnetic field and driven by a gear reduction motor through well-guarded variable pitch V belts and sheave.

The material to be treated is fed into the washer trough. Tailings are discharged at the lower end and the concentrates at the top. The magnetic flux of the coils is controlled by rheostats, offering maximum flexibility in adjusting the strength of the magnetic fields to the type of material being treated and the results desired.

These magnetic log washers can be made in various sizes, depending on capacities, the one shown being a 12 x 72-in., a size particularly adopted for laboratory use. The dimensions of this unit are 7½ ft. overall; 25 in. wide with a maximum width of 44 in., and 4½ ft. high. The new Stearns



magnetic log washer will operate from direct current up to 300 volts, or from motor-generator sets where direct current is not available.

Firms interested can have their materials tested in the Stearns laboratory to determine the most efficient type of magnetic separator suitable for their requirements.

CATALOGS AND BULLETINS

STOKER COAL CRUSHERS. *McNally-Pittsburg Mfg. Corp.*, 307 North Michigan Avenue, Chicago, Ill. Bulletin No. 941 describes and illustrates features of the company's latest improvements to its line of stoker coal crushers. 4 pp.

VIBRATING SCREENS. *Allis-Chalmers Mfg. Co.*, Milwaukee, Wis. Bulletin B6151A describes the manufacturer's new Ripl-flo vibrating screen, which operates on the principle of "Perfect-Circle" vibration. Successful applications in all scalping and coarse to medium fine screening operations in the crushing, mining, and other processing industries are reported in this new book. 19 pp.

WATER SPRAY-NOZZLES. *The Deister Concentrator Co.*, Fort Wayne, Ind. The company has recently issued a folder illustrating and describing features of its Concenco J-132 water spray-nozzles for washing of materials on a vibrating screen. 2 pp.

VALVES. *Everlasting Valve Co.*, 49 Fisk St., Jersey City, N. J. Bulletin E100 describes and illustrates the company's line of quick operating valves for blow-off, water columns and other boiler room services. Tables of specifications, dimensions and prices are also included. Pp. 32.

WELDING. *The Lincoln Electric Co.*, Cleveland, Ohio. The company has recently issued Bulletin 402 called "The Lincoln Weldirectory." It describes and illustrates the company's complete line of welding equipment. Pp. 56.

The "Fleet-Fillet" Welding Technique, Bulletin 432, describes a welding technique for speeding war production and cutting costs. The various methods are illustrated and tables of the company's electrode sizes are included. Pp. 16.

WIRE JOINTS. *Ideal Commutator Dresser Co.*, 1279 Park Avenue, Sycamore, Ill. Folder describes and illustrates the company's device for speedily connecting cut wire of the solid or stranded types. Pp. 4.

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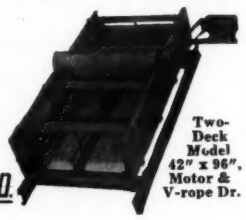
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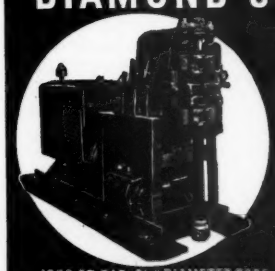
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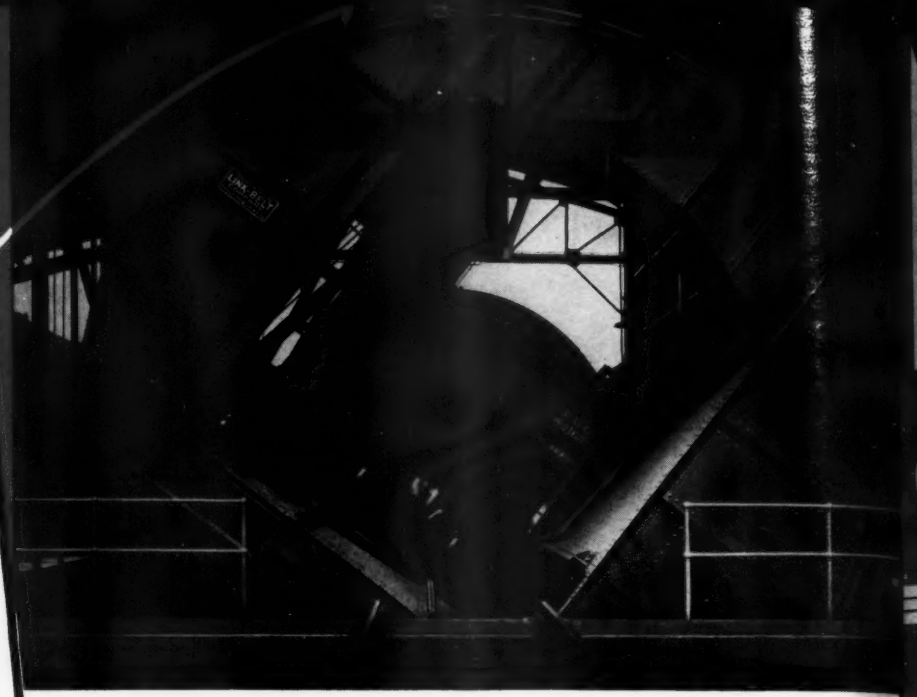

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VOL 10 NO 4

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